STRUCTURAL GEOLOGY and TECTONICS DIVISION

Newsletter
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CHAIRPERSON'S MESSAGE

As we are reaching cruising altitude on the way home from the JTPC meeting in Boulder, it is hard not to reflect on the dynamic yet trying times in which the geologic (and most of the scientific) community finds itself. In the immediate future, the New Orleans meeting will be a bit smaller than Seattle was, but the quality of abstracts submitted is every bit as high. Exciting things are afoot in planning for the future, including e-mail submission of abstracts for the next national meeting (Denver) and, hopefully, a Division homepage on the Internet. In the not too distant future, I anticipate that much of our Division business and communication will be paperless. The way we do some things may also change a bit, as discussion among the members of the Division's Management Board attending the JTPC meeting will lead to the proposal of several substantial changes in the bylaws that govern our operation.

A new mechanism for development of nominees for the Division's Best Paper Award must be devised. No award will be given this year for the simple reason that there were not sufficient nominees from the membership to make the process of selection meaningful. An amendment to our bylaws will be proposed at the Division business meeting in New Orleans; it will charge the Best Paper Committee with both nominating papers (nominations from members will, of course, continue to be encouraged) and selecting the winner of the award. In contrast, the Career Contribution Award continues to receive numerous strong nominations and that selection process will remain unchanged. Another proposed bylaw revision will change the role of the Short Course and Symposium Committee. You may remember that this Committee was reinstituted several years ago after a committee with a similar role ceased to function. Unfortunately, the new committee ran into some of the same problems which plagued the earlier verson, and we will propose a change in their charge to give them substantial authority to go with their responsibilities.

Too much of the talk at the JTPC meeting was not cheering -- the impending layoffs at the U.S.G.S; positions being lost at colleges and universities; grant funds becoming scarcer than ever and so on. We are clearly in a time of change, as the "contract" between the sciences and the larger society, forged under the winking light of Sputnik, is being dismantled. Despite a clear willingness on the part of this Congress to shut things down, we hear very little about replacing the current purportedly defective system with a better one. Discussion centered on the splintered nature of the earth sciences as compared to most other sciences, and the need to organize, if not a solo part, at least a chorus singing together to represent us at the national level. You will be hearing more of this in the future. In the meantime, see you in New Orleans!

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BIOGRAPHIES OF THE CANDIDATES FOR DIVISION OFFICES

The 1995 Nominating Committee of the Division has selected the following candidates for Division offices for 1995-1996:

For Chair (one candidate):

John M. Bartley received his Ph.D. degree from MIT in 1980, and is a Professor in the Department of Geology and Geophysics at the University of Utah. He is currently serving as an Associate Editor for both *Geology* and the *GSA Bulletin*, and he is on the Steering Committee for the 1997 GSA national meeting. John's research interests include three-dimensional kinematics of crustal extension in orogenic belts, time-space and genetic relations between Cenozoic crustal extension and magmatism in western North America, synkinematic metasomatism and volume changes in metamorphic core complexes, and structural geology and tectonics of continental thrust belts, particularly in the Basin and Range region.

For First Vice-Chair (one candidate):

Terry Pavlis was born in Wagner, South Dakota, in 1953. He received his B.S. degree from the University of South Dakota in 1974 and his M.S. and Ph.D. in 1979 and 1982, respectively, from the University of Utah. He taught at Lehigh University in Bethlehem, PA from 1981-1985 and has been on the faculty of the University of New Orleans since 1985. Terry was co-organizer, with Virginia Sisson and David Prior, of the recent Penrose Conference on "The effects of triple junction interactions with convergent plate margins" and he received the Structure and Tectonics Division's Best Paper Award in 1991. His current research interests include the geology of convergent plate margins, Alaskan tectonics, fold-thrust belt systems, Cordilleran extensional tectonics, and fault zone studies. He and his students have been involved in projects ranging from active tectonics associated with the Himalayan mountain belt to extension in the Death Valley region to the study of Mesozoic subduction events in Alaska.

For SecondVice-Chair (three candidates listed alphabetically; vote for one only):

Vicki L. Hanson: Degrees: B.A. 1980, Carleton College; M.S. 1983, University of Montana; Ph.D., 1987, UCLA. Positions: Associate Professor, Southern Methodist University, 1992-Present; Assistant Professor (SMU) 1988-1992. Honors: Sigma Xi Outstanding Research Award 1992-93; Graduate Woman of the Year Award, UCLA 1987. Service: GSA Committee on Penrose Conferences, 1993-95; Chair, 1994; NSF Polar Earth Sciences Program, Panel Member for Proposal Review, 1994; NASA Lunar and Planetary Geoscience Review Panel, 1993-1996; Scientific Program Committee, Venus II - Geology, Geophysics, Atmospheric and Solar Wind Environment, 1994-1996; Geology Editorial Board, 1990-1992. Associations: American Association of University Women; AGU; GSA; GAC; IASTG; National Association of Geology Teachers; Sigma Xi.

My professional interests include the development of L-S tectonites, the tectonic evolution of the North American Cordillera, the evolution of transpressional convergent margins, the formation of ìintra-continentî mountain belts, Archean and Proterozoic tectonism, supercontinent assembly, and the structural and tectonic evolution of Venus. My research has been supported with grants from GSA, NASA, NSF, the PRF of the American Chemical Society, and Sigma Xi. My husband, John Goodge, and I also share the joys and challenges of juggling two small children and two fulfilling careers.

James A. Helwig is a Geological Consultant, Mobil Oil Company, New Business Development, Dallas, Texas. He is a senior member of the geological staff responsible for structural and tectonic technical oversight of frontier exploration plays worldwide, and teaches in advanced technical courses. He received his B.S. in Geological Engineering from St. Louis University (1963) and his Ph.D. in Geology from Columbia University (1967). He has taught at Case Western Reserve University, was a visiting fellow at the University of Vienna, and has worked at ARCO Research, Schlumberger Research, and Mobil R&D prior to assuming his present position in 1991. His research interests include structure and tectonics, basin modeling and petroleum geology. Jim is a past-Editor of AAPG, previously served as Secretary-Treasurer for SGTD, and currently is serving as GSA Councilor.

Gautum Mitra was born in Chinsurah, West Bengal, India in 1947. He received his B.Sc. degree in 1968 and M.Sc. degree in 1970 from the University of Calcutta, and his Ph.D. degree from Johns Hopkins University in 1977. From 1977 to 1981 he taught at the University of Wyoming; in 1981 he came to the University of Rochester where he currently is a Professor. He has served on the editorial board of GEOLOGY (1986-88), has been an Associate Editor of GSA Bulletin (1986-88), coedited GSA Special Paper 222, and has been a member and chair of GSA SG&T Division Best Paper Award Committee. He has also been an Associate Editor of Journal of Structural Geology (1986-90) and continues to serve on its Editorial Advisory Board. His current research interests include: the use of microstructures and strain information in understanding the large scale kinematic evolution of fold-and-thrust belts in the Rocky Mountains, the Appalachians, and the Himalaya; deformation mechanics of basement rocks and sedimentary cover; the relationships between deformation and synorogenic sedimentation in orogenic belts.

For Secretary-Treasurer (one candidate):

Arthur G. Goldstein received his Ph.D. from the University of Massachusetts in 1980. He is currently Associate Professor and Chairman of the Department of Geology at Colgate University. Art's research interests include magnetic measurement of fabric and strain in rocks, tectonic history of the northern Appalachians, and microstructures and genesis of mylonites and shear zones.

NSF NEWS

In July, Dr. Carol Simpson completed what amounted to her second appointment as one of the two Program Directors of the Division of Earth Sciences' Tectonics Program. As many of you know from first-hand knowledge, Carol had done a superb job. Not only has she worked hard and successfully in reviewing and making decisions on proposals entrusted to us as competent and as fair as could be, she has managed to keep her own research program moving. Her energy, professional competence, organization, and good spirits will now be applied to her next appointment -- Chair of the Department of Geology, Boston University, Boston, Massachusetts. We all owe Carol a "thank you" and good wishes for the future.

T. W.

On Being an NSF "Rotator"

What is a "Rotator"? NSF has a system to bring in outside scientists for one year or more to add their expertise to an appropriate Division. The idea is that the Rotator brings to NSF fresh ideas and a good, first-hand knowledge of his/her branch of the scientific community to add to the

existing broad view and corporate memory of the regular NSF employees. In return the Rotators pick up some inside information about how NSF operates and takes it back to their home institutions so that everyone there can be more successful at getting NSF grants! Usually, Rotators come in as Program Directors, but they can be at any level up to that of the Director. Would I recommend an NSF Rotator position to anyone looking for a year or two of administrative experience? You bet! Would I do it again? Well, I already did, despite an almost two hour commute each way from Baltimore -- so, it can't be all bad! During my exit interview I was asked several questions about my time at NSF. What did I like best? What did I like least? Which was the most difficult part? Which the most rewarding? ... and so on. The first question is the easiest to answer, so I'll start there.

The best part of being a Rotator for me, apart from getting to know some wonderful colleagues and friends, was learning about the entire field of tectonics in some detail. It's like doing another higher degree -- this time with emphasis on breadth as well as depth. As a microstructural geologist with tectonic tendencies I had never had the time to fully understand all the nuances of problems related to paleomagnetism, seismic reflection interpretation, geochronology, facies analysis, and isotope geochemistry. I was blissfully unaware of the detailed tectonic problems of such places as the Caribbean, Southwest Pacific, Himalyas, China, and Kamchatka. Neotectonics and tectonic geomorphology glowed only dimly within my horizons. All that had to change, and fast! A related good thing was getting to know the community. Not just who does what, and where, and why, but actually talking with PI's about their work in other fields. Meeting PI's at conferences is one obvious way to do this, but an even better way is how faculty interact (or don't) with students, each other, and with the administration. I had the opportunity to visit several geoscience departments in the US and overseas, ranging from small to large and state-funded to private. Gaining some insight as to what makes some departments tick, others hum, and still others totally silent has been one of the more valuable experiences of my time at NSF.

The most lasting impression of NSF I received is one of an organization that goes to great lengths to achieve absolute fairness in the handling of proposals. Rules regarding conflicts of interest are strictly applied and adhered to. Program Directors are constantly reminded to avoid all appearance of a conflict of interest, even where none exists, to the extent of gracefully refusing offers of meals, drinks, etc. while at conferences or on site visits. Which reminds me to point out that being a Rotator won't noticeably increase your wealth! Whether as a Visiting Scientist paid directly as a federal employee by NSF, or as an Intergovernmental Personnel Action (IPA) paid indirectly by NSF through a "grant", the Rotators's salary is exactly the same as he/she would get for 12 months at his/her home institution. So, if it is financial advantage you are looking for, this isn't the way to go. But if you want the opportunity to learn more about your field, get to know more of the folks doing exciting and cutting-edge research, and gain valuable managerial experience, then I thoroughly recommend a stint as an NSF Rotator. You won't regret it!

Carol Simpson

Active Tectonics

New developments concerning the "Active Tectonics Special Emphasis Area" are that the hardcopy of the science plan is being sent to the printers and that we at NSF are putting together our response. A look at the galleys shows that the science plan booklet will be impressive, both visually and substantively. Roy Dokka has taken the job of shepherding the report through the printing process, backed up by George Davis, Larry Mayer and the members of the science plan committee. Between bouts of reading your proposals, picking reviewers and reading your

reviews, we are putting together an "announcement of opportunity for a special emphasis area in Active Tectonics" which will outline criteria for Active Tectonics proposals, the review procedures to be used, and the anticipated level of support that will be available. As you can imagine, such a thing has to be looked at by several internal offices before NSF will approve, print, and distribute it, so it will take a while before you can get a copy. Meanwhile, some money is being made available for proposals in the general area of Active Tectonics, which will be applied to proposals on the subject that were favorably reviewed by the existing Earth Science Division programs. Although the initiative is in NSF's long range plans, only reprogrammed Earth Sciences Division money is involved this year. A strong Active Tectonics program can not be funded by such reprogramming at the expense of already stressed existing programs, so there is mcuh more work required to secure an adequate funding base. Your input and advice will help NSF management to make proper and wise decisions. In other words, honk if you either like or dislike this, but HONK!

Tom Wright
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The following awards were made by NSF from the Tectonics Program

for the period January 1, 1995 -July 12, 1995:

P.I. (Institution) Title
Ave Lallement (Rice University)
Displacement Partitioning in Volcanic Arcs: Attu Island, Aleutians
Bodin (University of Memphis)
COLLABORATIVE RESEARCH: Distributed Deformation Near the Mendocino Triple Junction
Brandon (Yale University)
COLLABORATIVE RESEARCH: Paleogene Collision and Obduction of the Far- Traveled Olyutorsky Island Arc, Northern Kamchatka, Russian Far East
Burgmann (Univ. of California, Davis)
COLLABORATIVE RESEARCH: Active Uplift in the San Francisco Bay Area, California
Coe (Univ. of California, Santa Cruz)
A Paleomagnetic Study of Early and Middle Paleozoic Rocks in Tarim and Nantianshan Terrane, Northwestern China
Dalziel (Univ. of Texas, Austin)
Was Laurentia the "Southeast Pacific Continent?"
Day (Univ. of California, Davis)
Geochronology, Metamorphism, and Thermal Evolution of a Continental Margin Orogenic Belt: Northern Sierra Nevada, CA
Dokka (Louisiana State University, Baton Rouge)
Mesozoic-Cenozoic Tectonic Evolution of the Mojave Desert, California

Duebendorfer (Northern Arizona University)
COLLABORATIVE RESEARCH: Tectonic Origin and Development of an Isotopically Mixed Crustal Boundary Zone: The Proterozoic Mojave-Yavapai Boundary, Southwestern U.S.
Engebretson (Western Washington University)
RUI: Origin and history of the eastern San Juan Islands, Washington
Fitzgerald (Univ. of Arizona)
Uplift and exhumation of the Axial Zone in the Pyrenean Orogen, Spain
Garver (Union College)
COLLABORATIVE RESEARCH: RUI: Cenozoic Collision of the Olyutorsky Volcanic Arc, Northern Kamchatka, Russian Far East
Gilotti (Univ. of the State of New York)
A New Eclogite Province in the Caledonides of North-East Greenland: Petrology, Geochronology, and Tectonic Implications
Girty (San Diego State University Fndn.)
RUI: Element Mobility Patterns, Volume Loss, and a Ballooning Diapir
Goldstein (Colgate University)
Finite Strain, Geochemistry, and Volume Loss During Slaty Cleavage Formation, Taconic Slate Belt, VT and NY
Gromet (Brown University)
Age Constraints on Tectonism and Metamorphism in the Scandinavian Caledonides
Hames (Auburn University)
Midle to Late Paleozoic Extensional Development of the Lofoten Archipelago, North Norwegian Caledonides
Hanson (Texas Christian University)
Constraints on Gondwana Assembly: Geologic and Isotopic Studies of the Pan- African Zambesi Orogenic Belt in Southern Africa
Harms (Amherst College)
RUI: Geologic Studies in the Dorsey Terrane of the Northern Canadian Cordillera: Constraining the Outboard Limit of the Paleozoic Continental Margin
Harrison (Univ. of California, Los Angeles)
Thermal evolution of the Zanskar Shear Zone
Hesterberg (Franklin & Marshall College)
Statistical Estimates of Uplift from Stream Gradients and other Tectonically Sensistive Topographic Features
Hibbard (North Carolina State University)
COLLABORATIVE RESEARCH: Structural and Isotopic Characterization of the Milton Belt, Axial Zone of the Southern Appalachians
Hodges (MIT)
Deformation and the Mechanisms of Ar Loss in Mylonite Zones
Karlstrom (Univ. of New Mexico)
COLLABORATIVE RESEARCH: Nature of the Middle Crust During Orogenesis: Thermal, Mechanical, and Geodynamic Properties Inferred from Proterozoic Rocks of the Southwest
Karson (Duke University)
Geometry and Kinematics of Faulting and Dike Intrusion in the Tertiary East Greenland Rifted Margin
Kodama (Lehigh University)

Simplifying Multicomponent Magnetizations as an Aid in Spatially and Temporally Refining Apparent Polar Wander
Lee (Central Washington University)
Quaternary Evolution of the Eastern California Shear Zone Between Latitudes 36° and 38°
Liou (Stanford University)
Exhumation of Ultrahigh-Pressure Rocks in the Dabie Mountains, Central China
Liu (Univ. of Missouri, Columbia)
Gravitational Collapse and Tertiary Extension in the North American Cordillera
Merrits (Franklin & Marshall College)
RUI: COLLABORATIVE RESEARCH: Distributed Deformation at the Mendocino Triple Junction
Miller (Stanford University)
COLLABORATIVE RESEARCH: Active Uplift in the San Francisco Bay Area, California
Miller (Vanderbilt University)
Evaluating the Potential of Zircon and Monazite in Thermochronology of High Temperature Crustal Processes
Nelson (University of Washington)
Geochronology and Petrogenesis in Chortis and Xolapa: Implications for Central American Tectonics
O'Hara (University of Kentucky Research Fndn.)
Stable Isotope Geochemistry of Pseudotachylyte: Constrainsts on the Conditions and Mechanisms of Frictional Fusion During Brittle Faulting
Peacock (Arizona State University)
Thermal Evolution of the Catalina Metamorphic Core Complex
Samson (Syracuse University)
COLLABORATIVE RESEARCH: Structural and Isotopic Characterization of the Milton Belt, Axial Zone of the Southern Appalachians
Tucker (Washington University)
Timing of Precambrian Metamorphism and Magmatism in Madagascar (the Malagasy Republic): Implications for the Configuration and Fusion of Continental Fragments within the Gondwanan Supercontinent
Van der Voo (University of Michigan)
Paleomagnetism of the Avalonian Margin of Iapetus
Williams (University of Massachusetts, Amherst)
COLLABORATIVE RESEARCH: Nature of the Middle Crust During Orogenesis: Thermal, Mechanical, and Geodynamic Properties Inferred from Proterozoic Rocks of the Southwest
Williams (University of Massachusetts, Amherst)
U-Pb Dating of Staurolite and the Determination of P-T-t Paths in Orogenic Belts, an Example from the Proterozoic Orogen of the Southwestern U.S.A.
Wiltschko (Texas A&M University Research Fndn.)
GPS Investigation of the Actively Deforming Fold and Thrust Belt of Taiwan
Wintsch (Indiana University, Bloomington)
History of Terrane Assembly, Eastern New England

SG&T'S STUDENT RESEARCH GRANT WINNERS

For the first time, the Structural Geology and Tectonics Division has awarded research funds to two applicants to GSA's Research Grants program. The two students, whose identities and projects are described below, were selected by the Management Board of the Division from a number of candidates forwarded to the Board by the Society. Although normally only one student is honored by the Division and given travel support to attend the Annual Meeting, this year two students were selected for recognition. They are **Kurt N. Constenius** of the University of Arizona (advisers: **Roy A. Johnson** and **George H. Davis**) and **Timothy Paulsen** of the University of Illinois at Champaign-Urbana (adviser: **Stephen Marshak**). Coincidentally, both of the Division-funded projects are in areas proximal to Salt Lake City.

Constenius' GSA-funded project is related to his doctoral studies and is entitled "Structure and timing of the Deer Creek detachment fault system, Wasatch Mountains, Utah. He will examine the possibility that some of the large vertical displacement attributed to Late Cenozoic movement on the Wasatch normal fault may have occurred during an earlier episode of extension (Oligocene and Early Miocene) on the Deer Creek fault system.

The broader focus of his dissertation is the tectonic evolution of the Charleston-Nebo allochthon of central Utah. Constenius, whose earlier academic studies were at Montana State (B.S., 1979) and Wyoming (M.S., 1981), is no stranger to normal faults, having studied the Kishenehn Basin and the bordering Flathead normal fault in Glacier National Park for his Masters' thesis. Kurt is currently on educational leave from Amoco Production Company, where he was employed as a geophysicist from 1981 through 1992.

Tim Paulsen's doctoral research is entitled "The structural geometry, kinematics, strain, and tectonic significance of the Mount Raymond thrust: A major transverse zone at the southern margin of the Wyoming salient, Sevier orogenic belt, Utah." The specific objective of his research is to determine the processes that caused the Mount Raymond thrust, north of the Uinta Mountains, to have an east-west trace in an otherwise north-south-trending thrust belt. A broader objective is to better understand the nature of transverse zones in fold-thrust belts. Paulsen's studies will attempt to resolve whether the transverse geometry of the Mount Raymond fault is due to post-thrust uplift of the Uinta Arch, or whether it might be the expression of an oblique thrust ramp at the southern end of the Wyoming salient. Tim received his B.S. degree from Wisconsin-Madison in 1991. He was a NAGT/USGS summer intern in 1991.

The Division wants to congratulate both students for the excellence of their proposals to the Society, wishes them the best of success in completing their dissertation research projects, and hopes that they will be in attendance at our business and awards meeting in New Orleans. Congratulations are extended to faculty advisers Johnson, Davis, and Marshak as well! Mention should be made of the runners-up for Division-sponsored grant support. They included **Lila Meredith Lohr** (UC Santa Cruz), **Michelle J. Markley** (University of Minnesota) and **Mark Wingsted** (U Massachusetts - Amherst).

HEALTH ALERTS FOR FIELD SCIENTISTS:

A CONTINUING SERIES

This is the third in a short series of articles concerning possible disease-related health risks that field scientists may encounter. Hantavirus pulmonary syndrome was discussed in the March 1994, and 1995 Newsletters; coccidiodomycosis (Valley fever), and Lyme disease were also reviewed in March, 1995. This issue's column is concerned with malaria and the plague, the

former being one of the most serious diseases in the world and the latter of significally lesser concern. The information cited below comes primarily from publications supplied by the Center for Disease Control and Prevention, Atlanta, Georgia, including the Center's "Health Information for International Travel 1994" (U. S. Dept. of Health and Human Services Publication No. [CDC] 94-8280, for sale by the Superintendent of Documents, U. S. Government Printing Office, [202] 783-3238. International travelers can obtain current health information on specific countries from the CDC's automated travelers' hotline -- accessible from a touchtone phone, 24 hours-a-day, 7 days-a-week; the number is (404) 332-4559. It is recommended that you make your inquiry at least 6 weeks prior to departure. Another reference of potential interest to field scientists working overseas is "Staying Healthy in Asia, Africa, and Latin America" by D. G. Schroeder, Moon Publications, Inc., P. O. Box 3040, Chico, CA 95927-3040, $10.95 (paper, 180 p.).

Malaria

Malaria strikes tens of millions of people per year in sub-Saharan Africa, the Middle East, India, Southeast Asia and Indonesia, Central and South America, and Hispaniola. In 1988, more than 21 million new cases were estimated by the World Health Organization for Africa alone; nearly 2.8 million cases were reported for Southeast Asia, 1.1 million for the Americas, 700,000 for the western Pacific and 600,000 for the eastern Mediterranean. In contrast, Europe reported only 25 cases. More than 1,000,000 people die from this disease annually, with children being especially vulnerable. Malaria is a blood disease caused by four protozoans species of the genus *Plasmodium* . It is transmitted to humans through the bite of infected female *Anopheles* mosquitoes. The parasite is attracted to the liver where it multiplies and from where it is released back into the bloodstream over periods of days to years. Symptoms of contagion include chills (lasting up to an hour) and often headache, fever (often 104° F or more) that may be accompanied by delirium, nausea, and/or diarrhea. Sweating follows fever episodes. Fever may occur daily in early stages of the infection, but may then reoccur at intervals of 2 or 3 days. Malaria may be accompanied by anemia and jaundice. Symptoms can develop within 8 days of initial infection, or as late as several years following the termination of drug prophylaxis. Without early treatment, which can be effective, the disease can cause kidney failure, coma, and death.

Ironically, the incidence of malaria appears to be on the increase as the consequence of tropical and subtropical deforestation (terrane degradation that produces new sun-exposed breeding areas for the *Anopheles* mosquito) and the growing resistance of malarial parasites, most importantly *Plasmodium falciparum* , to chloroquine. This once-effective anti-malarial drug is now believed to have lost its effectiveness in all countries with *P. falciparum* except Mexico, Central America west of the Panama Canal, Haiti, the Dominican Republic, Egypt, and most countries in the Middle East (as of 1994, HHS [CDC] 94-8280). Other prophylactic drugs are available, (e.g. mefloquine, doxycycline), but none guarantee immunity against the disease. Travelers to areas where *P. falciparum* is endemic should consult health authorities for up-to-date information on malarial risk and prophylaxis. The CDC handbook referred to above lists the currently recommended anti-malarial drug on a country-by-country basis, as well as vaccination requirements for other diseases for each country. Prophylactic treatment should be started before visitation to areas where the disease is present and continued for variable periods of time after leaving such areas.

Prevention of malaria relies on prophylactic treatment before, during, and after visits to areas of the disease and on avoiding mosquito bites in such areas. Because the *Anopheles* mosquito has

nocturnal feeding habits, most risk of infection is between dawn and dusk. Protective clothing, insect repellent (DEET at concentrations ≥ 30% is most effective), and mosquito netting (bednets) are all recommended by the CDC. There is as yet no recognized vaccine against malaria, although a controversial synthetic vaccine deemed promising by some health authorities is undergoing testing by the Columbian biochemist Manuel Patarroyo.

Plague

Human (bubonic) plague is a bacterial disease (*Yersinia pestis*) transmitted to humans through the bites of fleas carried by various wild rodent hosts or by respiratory droplets (pneumonic plague) from infected people or animals. Although various expressions of the disease killed millions of people in Europe in the Middle Ages, urban outbreaks are now "rare and limited" (HHS 94-8280) -- not withstanding a recent major outbreak in India. Wild rodent plague is a "real, though limited" health risk across wide areas of Africa, Asia, and the Americas, with usually less than 1000 cases reported worldwide each year. The last urban plague epidemic in the United Staes (pneumonic) occurred in Los Angeles in 1924-1925 (wouldn'tcha just know it!) and began with infected domestic rodents; 30 of 32 people infected in October, 1924, died. *Y. pestis* is permanently established in western areas of the United States, Canada, and Mexico -- almost all incidents of the bacterial disease occurring west of the 101st meridian. Between 1970 and 1991, human plague cases in the western U.S totalled 296 and varied in number from as low as one to as high as 40 in any given year. New Mexico had more than half of the total number of cases for all western states during this period as urbanization spread into areas populated by the rock squirrel. Other wild rodents that can carry the disease include ground squirrels, prairie dogs, chipmunks, marmots, deer mice, and hares. Most new cases of the disease occur in the summer months, May through September. Cases of aerosol-borne pneumonic plague in the US over the past 60 years have originated exclusively from human contact with infected animals other than man, most commonly pet cats that have bitten or eaten infected wild rodents. [*Ed's note*: moral: either keep your pet cat indoors or don't let it sneeze in your face!]

Symptoms of flea-caused bubonic plague usually occur within several (2-7) days after infection, but not all may be present in a given victim. They include sudden onset of repeated chills and high fever (~103-106° F), headache and a general feeling of weakness, aches and chills in the upper leg and groin, a blackish pustule at the site of the fleabite, by the third day, swollen lymph nodes and red to black and blue splotches under the skin due to hemorrhage, mental confusion and shock. Symptoms for pneumonic plague are less definitive and can be mistaken for those of other respiratory diseases.

Although statistically the risk of plague infection is slight, field scientists working in New Mexico should be particularly aware of the risk. Cases in that state are concentrated in two distinct areas: the northwestern part of the state including the Navajo Indian Reservation; and the Rio Grande rift valley north of Albuquerque. As in the case of the newly discovered hantavirus, which is present in closely similar Cordilleran geographic areas, persons who experience high fever following fieldwork in mountain, desert, or suburban areas should seek immediate medical attention. Obviously attention should be paid to the physical evolution of suspected flea bites. The death rate of plague is high (>50%) if prompt medical treatment is not given. Early treatment by antibiotics (e.g. streptomycin) can be quite effective.

THEME SESSION SUMMARY:

RHEOLOGICAL AND STRUCTURAL EVOLUTION OF CONTRACTIONAL OROGENIC BELTS

Conveners: Phyllis A. Camilleri (Austin Peay State University, Clarksville, TN) and W. Adolph Yonkee (Weber State University, Ogden, UT)

The theme session ìRheological and structural evolution of contractional orogenic beltsî was held at the GSA meeting in Seattle, WA, in October, 1994. This session brought together the latest developments in the understanding of the rheological and structural evolution of convergent continental margins. Fifteen papers were presented that ranged in scope from discerning styles of ductile flow at depth in internal zones to brittle processes in external zones. Important themes that emerged from the session included:

* the importance of both contractional and extensional strains within interior parts of convergent orogenic belts as well as potential difficulties in interpreting the kinematic significance of some microstructures;
* rheologic layering of thrust sheets controlled by variations in lithology, depth, temperature, and rate of erosion;
* complex deformation histories within some thrust and fold systems that require modification of simple geometric models;
* and thrust sheet rotation about vertical axes.

The first four talks concerned the rheologic evolution and style of ductile flow in internal and plateau regions of convergent margins. **L. Royden** presented a 3-D analytical viscous flow model that explains the evolution of the geometry and structure of the Tibetan plateau. The model suggests that crustal rheology varies vertically and laterally across the plateau margins, requires subduction of Asian mantle, and suggests that the current elevation of the plateau was generated in the early stages of convergence and has been maintained for the past 30 million years. Two papers were presented concerning the origin of ductile extensional features developed synchronously with contraction and peak metamorphism. Both argued that extensional features were not a product of post-orogenic collapse. In the northern Scandinavian Caledonides, **C. J. Northrup** documented transport parallel extension and constrictional strain in a midcrustal contractional allochthon that was synchronous with thrust faulting. In northeast Nevada, **P. A. Camilleri** presented evidence that bulk coaxial stretching accompanied peak structural burial metamorphism of a footwall of a thrust fault. Camilleri argued that footwall stretching, induced by thermal relaxation, probably acted to assist isostatic subsidence of the thrust load. In light of the recognition that both extensional and contractional features can develop synchronously in contractional orogens, **D. Jiang** and **J. C. White** cautioned that S-C relationships in ductile non-coaxial shear zones should be carefully evaluated. They presented evidence that non-steady, heterogeneous flow, which is characteristic of natural deformation in many shear zones, may result in variable spinning of local instantaneous stretching axes and yield domains where microstructures have apparent inconsistent geometric and kinematic relations to the host shear zone boundaries. Limited sampling/study of a large shear zone could thus lead to erroneous assignment of whether the shear zone records extension or contraction.

Several papers focussed on structural analysis of frontal parts of fold and thrust belts, including rheologic layering and strain patterns in thrust sheets, folding mechanisms, and duplex kinematics. **J. E. Holl** and **D. J. Anastasio** presented results of an integrated structural analysis to characterize the rheology of the southern Pyrenean thrust wedge. Their data indicated that the wedge was rheologically layered due to temperature and lithologic variations, with a plastic rheology in evaporites at the base of the wedge, a thermally dependent quasi-plastic rheology in

the lower part of the wedge, and a broad transition region into an elastico-frictional upper part of the wedge. **W. A. Yonkee** discussed variations in structural style, strain , and deformation mechanisms within a thrust sheet in northern Utah. Limited internal deformation was produced by brittle faulting in the upper part of the sheet, whereas plastic deformation and minor folding produced significant internal strain that increased downward in the lower part of the thrust sheet, reflecting concentrated thrust-parallel simple shear and flattening. **G. Mitra**, **N. Pequera** (deceased), **A. J. Sussman**, and **P. G. Decelles** discussed a complex kinematic and sedimentation history for a thrust system exposed in central Utah. Major movement of an early thrust, accompanied by plastic deformation in the lower part of the thrust sheet, was followed by movement on an underlying thrust system which folded and uplifted the earlier thrust sheet resulting in erosion and deposition of a thick synorogenic sequence. **W. R. Jamison** and **S. G. Erickson** characterized the meso- and micro-scale strain and stress of a megascopic anticline in northeastern British Columbia. Their results indicated that layer-parallel shortening and stress were limited during early stages of folding, but penetrative shortening of limestone and fracturing of dolostone occurred during the later stages of fold tightening when differential stress increased significantly. **J. C. Pashin** and **R. H. Groshong** addressed the history of detachment fold growth within part of the southern Appalachians. Their data indicated that fold development here was best explained by progressive limb rotation about a fixed hinge with minor internal deformation of beds rather than self-similar growth with hinge migration.

J. C. Coogan used computer modeling, seismic data, and information from synorogenic deposits to unravel the complex kinematic history of a duplex system within a frontal thrust sheet in Wyoming. The duplex developed by early break-forward thrusting, translation up a major ramp, and late break-back thrusting and synchronous reactivation of linking and roof thrusts. **W. K. Wallace**, **T. E. Moore**, and **G. Plafker** presented the results of a reconstruction of the Brookian foreland thrust belt in the south-central part of the Brooks Range, Alaska. Pronounced rheologic contrasts imposed by alternating competent and incompetent stratigraphic units resulted in the development of an impressive set of vertically stacked (multistory) duplexes. **W. A. Thomas** and **R. J. McDowell** described an unusual type of displacement transfer system between oppositely directed thrusts that shared a common decollement within a triangle zone in the Appalachian fold and thrust belt of Alabama. Within the displacement transfer zone thrust and fold asymmetry changes along strike from dominantly northwest to southeast verging.

Three papers bearing on the tectonic evolution of the northern Cordillera were presented. **E. S. Cowgill** presented evidence that the Malton decollement [contact] in the Monashee Mountains, southeastern British Columbia, may be a deformed depositional rather than tectonic contact because of the lack of evidence of a zone of high strain localized at the contact. **J. W. Sears** and **R. A. Price** presented evidence that the northeast margin of the tectonically inverted Proterozoic Belt (Purcell) basin in the southern Canadian and northern Montana Rockies underwent 25-30 degrees of thrust-related clockwise rotation about an Euler Pole near Helena, Montana. In a companion paper, Price and Sears presented a regional synthesis of the tectonics of the southern Canadian-northern U.S. Cordillera. Along strike variations in the size of the thrust belt and magnitude of shortening were explained with a tectonic model that included transpressive terrane convergence and thrust rotation.

HAVE YOU HEARD ... ?

It's an unusual way to begin this column, but I feel compelled to ask, "Have you heard how much debris generated by the 1/17/94 Northridge earthquake has been hauled away through July of this year in metropolitan Los Angeles?" You probably haven't (and maybe don't care), but as an LA resident I personally find the amount fascinating. According to the *L.A. Times* , FEMA reports that 2.3 million tons of rubble were removed in the first 18 months of the cleanup operation at a cost of $233 million! That's 4,600,000,000 pounds! At a $100 per ton removal costs, the earthquake debris became more valuable to someone than most gold ore nowadays. Just how much debris is 2.3 million tons in readily understood terms? One estimate for the weight of the limestone blocks comprising the Great Pyramid of Khufu in Egypt (ca 2550 BC), which is 756 feet square at the base and 481 feet high, is 5 million tons. It may have taken 10,000 men laboring 25 years to build the pyramid. It took 65 crews, each with a skip-loader and two trucks, to remove half of that weight of debris in a year and a half. Although the FEMA-funded program of waste cleanup has now ended, another 120,000 tons of debris still sits on LA metropolitan area streets awaiting allocation of funds for its removal (and more is added each day -- debris, not funds). Enough of this rubbish! On to other things ...

A number of Division members have received (or will do so soon) praiseworthy honors or awards since publication of our last *Newsletter*. **Clark Burchfiel** is this year's recipient of our Division's Career Contribution Award, and former CCA-winner, **John Crowell**, is the Society's 1995 Penrose Medalist. Other Society awards will be given at the Annual Meeting to **Art Sylvester** (GSA's Distinguished Service Award) and **Walter Mooney** (the Geophysics Division's George P.Woollard Award). **David L. Jones** has been honored by the National Academy of Sciences with the Mary Clark Thompson Medal for service to geology and paleontology. And finally, **Bob Yeats** is the 1995 Richard H. Jahns Distinguished Lecturer, co-sponsored by the AEG and the Society's Engineering Geology Division. Congratulations to all of these individuals for their splendid achievements that led to these awards and honors. Word has come from the AGU that **Dave Scholl**, recently retired from the USGS, is the newly appointed Editor-in-Chief of *Tectonics*. Knowing Dave's boundless enthusiasm for whatever he is doing and his extensive background in marine-continental margin tectonics, the journal is in very good new hands!

1995 has been one of the best academic hiring years in recent memory for positions in structural geology and tectonics, although the large numbers of applicants for each position continues to be a discouraging element for job hunters. On the West Coast, **Kevin Pogue** (a **Bob Yeats**' Oregon State U student from 1994) has taken a position at Whitman College in Walla Walla, Washington. UCLA's Department of Earth and Space Sciences has hired **Gary Axen** (formerly of CISESE in Baja California and a '91 **Wernicke** Ph.D. from Harvard) for a position emphasizing continental tectonics. **Ramon Arrowsmith** (Stanford; **Dave Pollard** adviser) has been appointed as an Assistant Professor at Arizona State University in Tempe. The much sought-after position at the University of Colorado, Boulder, went to **Karl Mueller**, a former **Art Snoke** student at the University of Wyoming and a post-doc in **John Suppe**'s program at Princeton. Another Snoke advisee, **Allen McGrew**, will begin a tenure-track position in structural geology at the University of Dayton. McGrew has been an overseas NSF post-doc at ETH-Zurich and the University of Leeds. Also in Ohio, Miami University's Department of Geology has added **Richard Beck** (U.So.Cal., '95; adviser: **Doug Burbank**) to its faculty as an Assistant Professor. **Scott Wilkerson** (formerly of Exxon Production Research and a Ph.D. grad from Illinois, '91,under **Stephen Marshak**) has accepted the structure position at nearby DePauw University in Indiana. As you've read elsewhere in this *Newsletter*, **Carol Simpson** is the newly appointed Chair of the Department of Earth Sciences at Boston University. It somehow escaped us, but it should be

mentioned that **Ray Fletcher** has recently rejoined academia by becoming an Adjunct Professor at the New Mexico Institute of Mining and Technology in Socorro. **Keith Klepeis** (U. Texas, a former Ph.D. advisee of **Sharon Mosher** and **Ian Dalziel**) has taken a tenured position as a Lecturer in Structural Geology and Tectonics at the Department of Geology and Geophysics, University of Sydney. **Chris Goldfinger** (Ph.D., '94 at Oregon State with Bob Yeats) is a new Research Assistant Professor of oceanic and atmospheric sciences at OSU. **Myra Keep** (Ph.D., '94; an SMU advisee of **Vicki Hansen**) has left Mobil Research in Houston to join Paul McClay's Fault Dynamics Project at the Royal Holloway University in London; she has a two year post-doctoral appointment.

Miscellaneous academic news: **Rachel Burks** has received tenure at Towson State University in Maryland, as have **Joan Fryxell** and **Sally McGill** at Cal State University San Bernardino. **Doug Walker** has been promoted to Full Professor at the University of Kansas, and **John Bartley**, our next Division chairperson, became Chair of Utah's Department of Geology and Geophysics over the summer. While focused on Utah, **Dave Dinter** (an MIT advisee of **Leigh Royden**) is leaving the USGS (Menlo Park) behind him and joining John Bartley's program as a post-doc. In addition, **Hugh Hurlow**, a recent Ph.D. student of **Darrel Cowan** at U.Wash. has accepted a position with the Utah Geological Survey, where he'll be involved in a geologic and hydrologic study of the Virgin River Basin.

As we all know, employment opportunities are down in the petroleum industry, but one bit of good news from Houston is that Exxon Production Research has recently filled a number of positions. New EPR'ers include Ph.D. persons **Mary Johns** (U.Texas; adviser Sharon Mosher), **Zeke Snow** (CIT post-doc and a Wernicke advisee), and **S. Julio Friedmann** (U.So.Cal; adviser Doug Burbank). Just how depressed is the oil industry? Some figures in the August issue of the *AAPG Explorer* give a clue. Listing the top 10 corporate employers of AAPG members in 1994 (Exxon[#1], Chevron, Amoco, Mobil, Shell, Texaco, Arco, Conoco, Unocal, and Marathon), the *Explorer* notes that collectively they now employ 40% fewer AAPG members than they did in the mid-1980's. At their peak these companies once employed 7128 geologists who were AAPG members; the 1994 total was 4289.

You've all heard by now of the mid-August "axing" of 500 USGS employees from its Geologic Division, a very sad turn of events for those individuals concerned and one that will have negative consequences throughout our entire scientific profession and on the general public as well. Our science has lost some very fine people and important contributors through no fault of their own. It's strictly a personal view, but the "RIF" or "reduction-in-force" (sounds so benign, doesn't it?) of the USGS might be easier to accept if the Congress that forced it hasn't proposed to spend billions on weapons systems that the Defense Department doesn't want. *GSA TODAY* (August) has announced the passing of former USGS geologist **Jack Harrison**, whose perceptive work on the stratigraphy and structure of the Belt Basin spanned several decades.

Have you heard of the bureaucratic surprises coming out of British Columbia? Looks like the USGS isn't the continent's only troubled national geological survey. Earlier this year, the Geological Survey of Canada announced that its Cordilleran Division, based in Vancouver, will be amalgamated with its marine-oriented Pacific Geoscience Center at a new location in Victoria on Vancouver Island. This decision has created unhappy waves in Vancouver's geoscience and mining communities, perhaps including the unexpected resignations last Spring of **Dirk Tempelman-Kluit** from both his position as Director of the Cordilleran Division and from the GSC itself. Hopefully, Dirk, a long-time friend and legendary wilderness geologist *par excellence* , will continue his Cordilleran tectonic studies with another organization. I agree with

the comment of Dirk's former GSC colleague Paul Metcalfe (and new editor of GAC's *GEOLOG*) that "G.S.C. Vancouver without Dirk would be as strange as Vancouver without the G.S.C.".

Moving some of GSC's operations from Vancouver to Victoria might not be a good idea, given the latter city's greater proximity to the Cascadia subduction zone. In recent years, a number of earth scientists have postulated that a great earthquake occurred along the zone about 300 years ago (submerged coastal forests in Washington and Oregon that died then being one line of evidence). In a tantalizing bit of seismic detective work, Kenji Satake of the University of Michigan and colleagues at the University of Tokyo have discovered that a major tsunami struck Japan early in the morning of January 28th, 1700. As reported at the May meeting of the Seismological Society of America, seismic sea waves 2 to 3 m-high struck the Japanese coastline. Historic records from western South America and Kamchatka appear to rule out a major seismic event at that time for those regions, leaving Alaska, the Aleutians, and the Pacific Northwest as possible areas of tsunami generation. Satake and his co-authors calculate that an earthquake along the Cascadia zone large enough to have produced the 2 to 3 m-high waves in Japan must have had a magnitude near 9! Maybe the GSC should move both the Pacific Geoscience Center and the Cordilleran GSC to Kamloops or Prince George!

G. D.

REACTIVATED BASEMENT STRUCTURES:

RECOGNITION, DATING, SIGNIFICANCE

The Structural Geology Division of the Geological Association of Canada announces a special session on reactivated basement structures at the forthcoming GAC-MAC annual meeting in Winnipeg, May 27-29, 1996. The session will focus on practical aspects of investigating long-lived basement structures. Papers, either oral or poster, are invited that address the following questions:

ï How are reactivated basement structures identified, especially in areas lacking young rocks or sediments?

ï How can we date the most recent motion on reactivated basement structures?

ï What significance do reactivated basement structures have for engineered structures in shield areas?

There is considerable controversy surrounding these questions, particularly in light of increasing public concern over basement stability beneath areas of high population density and major power installations. Clearly both over- and under-estimating the risks of seismic reactivation can have disastrous results. The intention of this special session is to examine the basic data from which these estimations are formed, and the session is not restricted to currently active structures. The theme of the session is particularly appropriate for Winnipeg '96 in light of growing evidence for post-Precambrian displacement in the Canadian Shield, and in light of research into basement stability in Manitoba with respect to the AECL Underground Research Laboratory at Pinawa. Possible paper topics include geological and geophysical investigations and remote sensing analysis of reactivated structures, neotectonics, paleoseismicity and sedimentation patterns related to basement reactivation, dating reactivation and paleoseismic events, seismic risk assessment of reactivated structures, and site investigations for engineered structures.

Abstract deadline is December 1, 1995. Please contact the session organizers if you have questions or suggestions. They are Colleen Elliot and Stephen Kumarapeli, Dept. of Geology, Concordia University, 7141 Sherbrooke Street West, Montreal, Quebec, Canada H4B 1R6; phone: (514) 848-3300; fax: (514) 848-4521; e-mail: colleen@vax2.concordia.ca.

ROBERT S. DIETZ (1915-1995)

Tectonics lost one of its greatest contributors with the death by heart attack of Robert Dietz at his home in Tuscon, in May. He was 80. While I am not the ideal person to write a tribute to the man and his work -- I knew him only casually over the years -- it has long been my opinion that Bob Dietz numbers among the most important earth scientists of this century. Dietz received his Ph.D. in geology from the University of Illinois in 1941, and served as an Air Force pilot in World War II. After the war he jointed the Navy Electronics Laboratory in San Diego (1946), took a Fulbright fellowship in Japan, served as a scientific liason officer with the Office of Naval Research in London (1954-1958), and returned to NEL in 1958. While in London, Dietz collaborated with Jacques Piccard who was then developing the bathyscaphe "Trieste",. He later co-authored a book with Piccard on the 1960 descent of the "Trieste" into the Challenger Deep (Piccard, J., and Dietz, R. S., *Seven miles down*., G. P. Putnam's Sons, New York). Dietz joined the Geology Department at Arizona State University in 1977, retired there in 1985, but continued as an active professor emeritus until his death.

Given the interuption of Dietz's career by the war, it is perhaps not surprising that his most profilic period of research activity did not begin until he was well into his 40's. H. W. Menard, in his fascinating book "The Ocean of Truth -- A Personal History of Global Tectonics" (Princeton University Press, 1986) described Dietz's remarkable emergence as a scientist with these words (p. 154):

"From age 40 to 44 Dietz was essentially detached from creative scientific research. He did not suffer for it; he lacked original data, but apparently his mind was in ferment and the absence of new details fostered a broad view. In any event, not long after he returned to the Navy Electronics Laboratory in 1958 he began to pour out papers. Between June 1960 and December 1961 he was sole or first author of eight scientific papers, seven abstracts, a reply to a discussion, and an article in the *Scientific American*, as well as the book with Piccard. Half the publications were divided among marine geology and the concept of sea-floor spreading, but the other half were about his major research topic, meteorite impacts with the earth."

Most earth scientists will probably remember Dietz most vividly for his development of the concepts of sea-floor spreading (*Nature*, 1961; coevally, and probably independently of Harry Hess according to Menard, who knew them both). As a young instructor of "geotectonics," I remember being especially impressed with his 1960's papers (some co-authored with J. C. Holden) on the sedimentological and tectonic evolution of passive continental margins and his introduction of the concept of miogeoclines (as opposed to miogeosynclines). Of no lesser importance to these studies of ocean basin and continental margin tectonics, however, was Dietz's publication in the same year as his sea-floor spreading paper of a *Scientific American* paper entitled "Astroblemes." Dietz had been interested in impact structures even while a grad student and had published a paper in 1946, on the origin by meteorite impact of the Moon's surface features. It was thus logical for him to reinterpret the origin of some circular terrestrial

"cryptovolcanic" or "cryptoexplosion" features as the products of meteorite collision, a hypothesis bolstered in part on their association with assemblages of radiating rock fractures -- "shattercones" -- which appeared to have a shock-connected origin. He had been fascinated by such structures in Paleozoic carbonate rocks at Kentland, Indiana,while at student at Illinois. Although not the originator of the concept that some of the cryptic circular features were impact-caused, Dietz's highly controversial article introduced the term "astrobleme" (literally, "star wound") and did more than perhaps any other paper to lay the foundation for what is now wide acceptance of terrestrial impact structures and their sometimes critical role in extinction and evolution of life on the planet.

Some of my favorite publications by Bob Dietz are listed below:

1961, Continent and ocean basin evolution by spreading of the sea floor: Nature, v. 190, June 3, p. 854-857.

1961, Astroblemes: Scientific American, January, p. 49-58.

1963, Collapsing continental rises: An actualistic concept of geosynclines and mountain building: Jour. Geol., v. 71, p. 314-333.

1963, Alpine serpentinites as oceanic rind fragments: Geol. Soc. America Bull., v. 74, p. 947-952.

1964, Origin of continental slopes: Am. Jour. Sci., v. 52, p. 50-69.

1966 (with R. C. Holden), Miogeoclines (miogeosynclines) in space and time: Jour. Geol., v. 74, p. 566-583.

1966 (with R. C. Holden), Deep-sea deposits in but not on the continents: AAPG Bull., v. 50, p. 351-362.

1970 (with J. C. Holden), Reconstruction of Pangaea: Breakup and dispersion of continents, Permian to present: Jour. Geophysical Research, v. 75, p. 4939-4956.

Sea-floor spreading, alpine-type serpentinites as remnants of oceanic lithosphere, miogeoclines and continental terrace wedges, astroblemes, and the progressive breakup of Pangea -- a wonderful littany of topics originated or developed by Dietz in a stellar decade from 1961 to 1970. It was a super show and I, for one, believe it needed to be shared with those of you who missed knowing the man and his work.

Greg Davis

THE RESOURCE BIN

"Best Structure" Slide PhotoCD

As one result of a recent Keck Geology Consortium workshop entitled "Teaching Structural Geology," twenty structural geologists each contributed their "five best structure slides" for compilation as a Kodak PhotoCD. The CD images can be viewed at several resolutions on IBM or Macintosh computers, projected, manipulated, printed, pasted into handouts, and used in other ways for teaching purposes. Detailed captions for each slide are included with the CD.

The CD is available from H. Robert Burger, Dept. of Geology, Smith College, Northampton, MA 01063 [phone: (413) 585-3942; fax: (413) 585-3786; email: rburger@science.smith.edu]. The at-cost price is $25 (US). All orders must include payment as this is a voluntary enterprise and invoices cannot be issued. Payment must be by U.S. Postal money order, or in U.S. funds drawn on a U.S. bank. Checks or money orders should be made payable to: Smith College.

Southern California Earthquake Stuff

The following information comes from the *Southern California Earthquake Center Quarterly Newsletter*, v. 1, no. 2, Summer, 1995. Those interested in Southern California neotectonics and seismicity may find something of interest here:

ï *Fault Activity Map of California* The most recent source of information about faults in California. Copies may be obtained by mailing a check for $20 (includes shipping) with your written request for Map #GDM-006 to: California Division of Mines and Geology, P.O. Box 2980, Sacramento, CA 95812-2980.

ï *The Seismic Hazards Map, Probable Earthquakes, 1994-2024*. A Phase II map is now online through the World Wide Web. An explanatory text has been added for end users. The URL is: http://scec.gps.caltech.edu/PhaseII.lhtml.

ï *Seismic Hazards in Southern California: Probable Earthquakes, 1994-2024*. Reprints of this article, published in the April, 1995, *Bulletin of the Seismological Society of America*, and with color figures and maps are available. Price: $5. Order from: SCEC Knowledge Transfer, University of Southern California, Los Angeles, CA 90089-0742 [phone: (213) 740-5843; fax: 740-0011; email: jandrews@coda.usc.edu.

ï *Killer Quake*. An excellent recent NOVA video covering the Northridge earthquake and the future earthquake risk to the greater Los Angeles area, emphasizing earthquakes that may occur along blind thrust faults. Footage of the Northridge and other California earthquakes at the time of shaking or very soon thereafter is quite spectacular. Cost: $19.95, not including shipping. Can be ordered by calling (800) 255-9424.

ï *Earthquakes in California and Nevada*. This USGS publication announced in the March, 1995, *Newsletter* plots the epicenters of 300,000 earthquakes on a colored topographic base, including 49 of Magnitude 6.5 or larger that have occurred in the two-state area since 1836. Priced at $12 per copy, or $22 for a laminated copy (both prices including shipping costs), this splendid map is available by mail only from: Earthquake Maps, U. S. Geological Survey, Box 25046, Federal Center, MS 967, Denver, CO 80225. Orders must include the name and number of the map "Earthquakes in California and Nevada; Open-File Report 94-647", and a check or money order payable to DOI/USGS.

ï *Southern California Earthquake (SCEC) Quarterly Newsletter*. Subscriptions available: SCEC, University of Southern California, Los Angeles, CA 90089-0740 [phone: (213) 740-5843; fax: (213) 740-0011]. Subscription price: $25 yearly. Please make payment by check, money order, or PO, payable to "University of Southern California/SCEC". Price includes postage within the U.S. Overseas airmail costs or special courier services will be billed. The summer issue reports that the Northridge earthquake of 1/17/94 has had 11,865 aftershocks through 6/30/95, with the following magnitude distribution: 5.0 or more = 10 events; 4.0-4.9, 48; 3.0-3.9, 378. The larger 1992 Landers earthquakes has had more than 56,000 aftershocks, including the 6.5 Big Bear event, 20 other earthquakes of 5.0 or more and 162 between 4.0 and 4.9!

ï Want information on earthquakes? For recent southern California earthquakes call (800) 286-7233 or (818) 395-6977; for earthquakes in northern California, call the USGS in Menlo Park @ (415) 329-4011; for earthquakes elsewhere in the United States, call the National Earthquake Information Center, (303) 273-8516.

A NOTE FROM THE EDITORS

For the March, 1996, edition, Division members are invited to send us their opinions regarding the new regulation governing NSF research proposal submittals, i.e. no resubmittals of rejected

proposals until a full year has passed. Do you regard this new restriction as fair? How does it affect untenured faculty members who have tenure-track clocks to deal with? Could NSF have come up with alternative ways for cutting down the number of proposals being submitted, thus reducing the administrative and review load on Program Directors, external reviewers, and review panel members? Email or fax transmittal of your opinions are encouraged.
We always welcome your comments on any topics of interest to the Division, and remind you that students now have a new forum for their opinions in "THE RAP COLUMN." Please keep us informed about career changes by you or others for the "HAVE YOU HEARD ... ?" column, and send us announcements of forthcoming special events. We welcome both your comments on *Newsletter* content and suggestions for other types of material or articles that you would find useful in future issues. The deadline for inclusion of materials in our next issue is January 20, 1996. Please send lengthy items on a Mac diskette if possible or transmit to us via email:
Greg Davis: phone (213) 740-6726; fax (213) 740-8801; email: gdavis@usc.edu
Scott Paterson: phone (213) 740-6103; fax (as above); email: Paterson@usc.edu

1995 ANNUAL MEETING -- NEW ORLEANS

The early November meeting of the Society in New Orleans has much to offer Division members. Listed below are the Division-sponsored symposia, two Division co-sponsored short courses, and a number of theme sessions of special interest to structural geologists and tectonicists:

ï DIVISION-SPONSORED SYMPOSIUM: "Products and processes of continental extension" (John Bartley and John Geissman, conveners)
ï GSA AND DIVISION CO-SPONSORED SHORT COURSE: "Introduction to experimental modeling of tectonic processes" (faculty: Bruno Vendeville, Martha Withjack, and Gloria Eisenstadt); Sat. and Sun., 11/4-5. See below.
ï GSA AND DIVISION CO-SPONSORED SHORT COURSE: "Essentials of subsurface mapping" (faculty: Duncan Goldthwaite and Robert B. Branson); Sun. 11/5. See below.
ï "25+ years of plate tectonics: where do we go from here?"; symposium and accompanying theme session (Serpa and Pavlis, conveners)
ï "Geology and tectonics of the Caribbean region"; symposium and accompanying theme session (Ave Lallement, Sisson, and Draper)
ï "Third international symposium on the Cenozoic tectonics and volcanism of Mexico" (Nieto-Obregon)
ï Theme session: "Tectonic geomorphology and paleoseismology in intraplate tectonic settings (Merritts and Schweig)
ï Theme session: "Proterozoic terranes of the Americas: Bridging the Gulf and Caribbean (Mueller, Heatherington, Fullagar, Ruiz)
ï Theme session: "Before the Gulf -- Paleozoic tectonics of the southern margin of Laurentia" (Viele)
ï Theme session: "Tectonic and paleoclimatic records from rift basin sediments of East Africa and Siberia" (Williams and Johnson)
ï Theme session: "Impact in the Gulf: Chicxulub" (Steiner and Bell)

Editors' note: We invite the conveners of the symposia and theme sessions listed above to submit summaries of their programs to the March, 1996 *Newsletter* by January 20th. Please send your

summaries on a Mac diskette, if possible, or transmit to us via email. We applaud conciseness and reserve the right to edit or condense your summary somewhat if space limitations so demand .

THE DIVISION'S 1995 CO-SPONSORED SHORT COURSES

Introduction to experimental modeling of tectonic processes (Bruno Vendeville [Bureau of Economic Geology, U. Texas, Austin], Martha Withjack [Mobil Exploration and Producing Technical Center], and Gloria Eisenstadt [Mobil Exploration and Producing Technical Center])

A one and one-half-day course (Saturday & Sunday, Nov. 4-5) for earth scientists that will teach them how to critically evaluate the significance, or lack thereof, of published modeling results. Participants will learn not only how to evaluate the results of the experimental studies of others, but how to apply such results to their own work, and how to design their own experiments. Introductory lectures will describe the mechanics of geologic systems, the assumptions of experimental modeling, and the basics of scaling. Hands-on exercises and experiments, coupled with short lectures and discussions, will demonstrate the pros and cons of a variety of modeling materials (sand, putty, clay), techniques (e.g., centrifuge), and experimental designs (e.g. boundary conditions). The instructors have had broad and diverse experience in extensional, thrust belt and salt tectonics, structural interpretation of seismic data, cross-section balancing, and analytical, geometric, and experimental modelling.

Fee: $185 (student fee, $165) includes the course manual and lunch on Saturday; participant limit: 30. For additional information contact Edna Collis, Continuing Education Coordinator, GSA headquarters.

Essentials of Subsurface Mapping (Duncan Goldthwaite and Robert Branson, Atwater Consultants, Ltd., New Orleans)

This is a one day course (Sunday, Nov. 5) designed to introduce earth scientists to the principles and techniques of geologic mapping using data derived from wells. Included are recognition of faults and unconformities, fault cut vs. fault throw, repetition or loss of section with both normal and reverse faults, handling of deviated wells, conversion of measured thickness to true stratigraphic thickness and true vertical thickness in deviated wells and dipping beds, and discussion of various types of faulting and the mapping thereof. The course should be of interest to anyone whose work involves the interpreting of subsurface geologic data. It also includes such topics as contouring, the integration of fault plane structure maps with formation structure maps, and the construction of isopach maps with an eye to estimating net reservoir reserves and net pay isopachs. The faculty members have approximately 70 years of combined experience in petroleum and minerals exploration. Attendees must have had a basic course in structural geology.

Fee: $215 (student fee, $195) includes manual and lunch; participant limit: 40. For additional information contact Edna Collis, Continuing Education Coordinator, GSA headquarters.