The Engineering Geologist

THE GEOLOGICAL SOCIETY OF AMERICA

NEWSLETTER OF THE ENGINEERING GEOLOGY DIVISION OF THE GEOLOGICAL SOCIETY OF AMERICA

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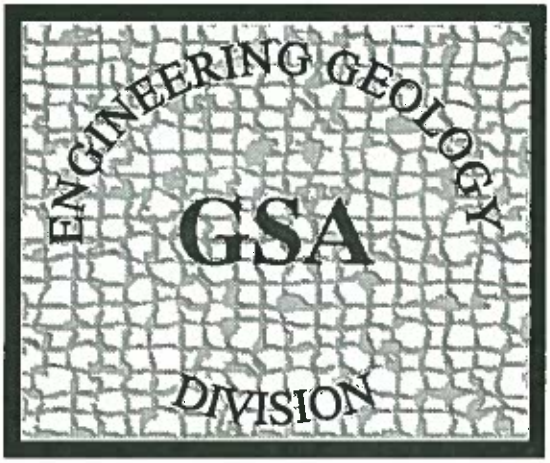
CHAIR'S MESSAGE

WHAT'S IN A NAME?

The Engineering Geology Division (EGD) Management Board voted at the Annual meeting in Boston last fall, to request that the GSA Council consider changing our name to Engineering and Environmental Geology Division. The vote becomes, in effect, a request for action at the Council level of GSA, and does not mean that our masthead or any other reference to our Division instantly changes.

This vote signals our collective recognition of the need to be more inclusive of those geologists and other earth scientist members of GSA who find the application of geology to environmental issues their professional home. Most of us are aware of the long tradition that engineering geology has played in applying geologic principles to our environment. We feel a special ability and affinity for the arena of environmental geology based on our experiences in advocating that the site geology be fully integrated into the science of decision making for actions on our lands.

Although engineering geologists' most conspicuous history has been in development of our environment's riches, considerable efforts have been directed in the last 15 years to remediation of these impacts. One of the most attractive aspects of being a GSA member working in the latter arena is that we are exposed to various points of view about the effectiveness of these new efforts. Upon review, one can conclude technical professionals are least represented. The cycle of legislate and litigate



that the efforts to restore the land have occurred at varied levels of effectiveness, just as the success of efforts to develop the land has produced differing values, depending upon one's point of view.

Our future does not hinge totally on our name, but planning for our future does require us to objectively analyze our values. All geologists must benefit from the work of practitioners, teachers, and researchers in the application of geologic principles to managing and sustaining our environment. And we should be leading, not following, the evolution of geology in this arena.

BEYOND LEGISLATE AND LITIGATE

It is an EGD tradition that each Chairman develop a theme to be her/his career contribution to the health of engineering geology. I have concluded that we must progress beyond the debilitating cycle of legislate and litigate, to prevent further "deterioration" of our profes-

consumes the available resources, too often at the expense of funding on-the-ground solutions.

I believe that we must develop a credible plan to attack the resources' exploitation that is the cost of the cycle of legislate and litigate. Consensus for its support could be built around the following concerns to our profession:

1. Arguing the scientific merit of solutions is becoming increasingly the purview of the courts. *Do we want expert witness testimony to be key source of employment for senior professionals; or do we want senior professionals' input in transferring new ideas into solutions, and new problems into research opportunities?*

2. Legislating quality of life is neither plausible nor possible. *Are we willing to serve not only as employees of consulting firms with opportunities for profit-sharing bonuses; but also, as public agency directors to provide leadership for government programs based on science, even if we may have to give up financial security and personal privacy?*

3. Adding economic growth without the creation of new products has a limited and finite outcome. *Are we willing to look beyond drawing political "lines in the sand" to a paradigm of local management by representatives of all users of our resources, our environment, and our future?*

I submit that we must say yes to actions that defeat the cycle of legislate and litigate. More than ever, linkages must be formed among consultants, researchers, teachers of all age students, and public service employees. We must do so without disrespect for the values implied by the professional employment choices of those other than ourselves. No one person or type of professional can possibly have all of the answers, or successors by how well we forged alliances to get answers, more than by the lasting value of our solutions to current problems.

THE GREAT FLOOD OF '93 SYMPOSIUM

Our Division was a co-sponsor with three other GSA divisions of this special session, at the Annual Meeting in Boston, as you have already read in *GSA Today*. As a co-convener, I observed that a scientifically rigorous analysis of events means that all of us must learn about the complex interfaces of many different specialties of geology. We listened to the special presenters tell us how the scope of this event was so great, that claiming turf for professional expertise was as effective as trying to hold back floodwater several meters above flood stage, using sandbags whose weight could not be supported by the narrow levee foundation. Hopefully, we will continue to share our strengths instead of dividing our differences as GSA and the EGD grow into the next millennium.

In closing, our Newsletter Editor has probably seen new heights of notoriety in failing to provide timely input by a Chairman from yours truly. I confess that over-committed is not a condition that I readily recognize. However, since I cannot fathom an enjoyable life as an engineering geologist without actively taking responsibility for my profession, I will be doing what every over-committed person is advised to do--delegate and include others! If you wish to volunteer before I call you, try <grahamr@abqa.saic.com> (Internet now works for me); or call (505) 842-7827; FAX (505) 842-7798.

Rhea Graham
Science Applications International Corporation
2109 Air Park SE
Albuquerque, New Mexico 87106

E. B. BURWELL, Jr. AWARD

The E. B. Burwell, Jr. Award Committee has considered two nominees for the 1994 Award. Upon approval by the EGD Management Board the final selection will be announced at the Seattle meeting in October 1994.

Tidbits

STATUS OF NEW PUBLICATIONS

GSA *Reviews in Engineering Geology* on Clay and Shale Slope Instability consisting of ten manuscripts is ready for submission to GSA for publication. Congratulations to Editors William C. Haneberg and Scott A. Anderson, and thanks to all contributing authors!

JOINT GSA-SEG (Society of Economic Geologists) SYMPOSIUM IN SEATTLE

"Meyer Symposium: Maintaining Compatibility of Mining and the Environment," is to be held on Tuesday, October 25, 1994. The symposium has 10 invited speakers from industry, government, environmental groups, and universities. The symposium will conclude with a 1.5 hour panel discussion with six panelists addressing the question: *How can SEG and GSA help form a more effective community of industrial, governmental, and university scientists to voice their collective opinions to offer advice on policies concerning resource management, resource education, and science policy.*

SUCCESS OF SYMPOSIUM on *Effects of the 1992-93 Winter Storms on the Southwestern Cordillera*

The Cordilleran Section meeting on March 21-22 in San Bernardino, California was the largest symposium or theme session at the meeting with 26 presentations. Congratulations to Symposium Convener, Robert A. Larson, who may have the best idea for our next symposium in the *Reviews in Engineering Geology* series.

GSA EDUCATIONAL PROGRAMS SUMMARY

The following is a summary of educational programs - recent, current, and planned. If you would like additional information, contact Ed Geary, Coordinator for Educational Programs, GSA 303/447-2020, x145, FAX 303/447-1133, EMAIL: Internet: 76260.2416@compuserve.com.

1993 Summary

The GSA's SAGE (Science Awareness through Geoscience Education) program continues to grow and expand. In 1993, SAGE handled 805 requests for information and materials, a substantial increase from the 529 requests received in 1992. In 1993, we also: (1) planned and convened three national earth science education conferences, (2) watched the Partners for Excellence Program grow from 500 to 737 members, (3) developed an internal GSA communications network on education, (4) helped with the formation of two earth science education coalitions, one state (CESSEN) and one national (CESE), (5) made several awards to outstanding K-12 earth science teachers, (6) began development of several projects and products, and (7) submitted a number of funding requests to national and regional foundations to fund these projects.

We are pleased to report that over 300 K-12 teachers participated in the 1993 GSA meeting activities. As in previous years, hundreds of GSA members volunteered their time, expertise, and energy to make these, and other SAGE activities possible. 1993 was also marked by the addition of Dr. Barbara Mieras to the SAGE staff on a part-time basis. In 1994, contingent upon funding from non-GSA sources, we anticipate continued, moderate expansion of SAGE programs, staff, and products.

JANUARY 1 TO APRIL 15, 1994 SUMMARY

During the first quarter of 1994, GSA staff and members were involved in several earth science education meetings workshops. These included: the second annual Coalition for Earth Science Education meeting in Reston, Virginia, the National Science Resource Center workshop in Huntsville, Alabama, the National Science Teachers Association annual meeting in Anaheim, California, GSA section meetings in San Bernardino, California, Little Rock, Arkansas, Binghamton, New York, and Blacksburg, Virginia, and the GSA national education committee meeting in Boulder, Colorado. Education activities are also scheduled for the North Central meeting in Kalamazoo, Michigan, and the Rocky Mountain meeting in Durango, Colorado.

Preliminary planning for the 1994 Annual Meeting in Seattle, Washington is now complete. The current schedule of education activities includes: nine workshops, eight symposia or theme session, five field trips, and an earth science share-a-thon. Sponsors include, SAGE, NAGT, NESTA, AGU, AWG, FEMA, NSF, the Joint Education Initiative, Educational Testing Services, the Southwest Educational Development Laboratory, the Paleontological Society, the Geoscience Education Division, the Structure and Tectonics Division, and the Quaternary Geology and Geomorphology Division. Education activities cover a wide variety of topics and will provide learning opportunities for K-16 teachers, graduate students, and scientists. For additional information on these activities, please see the June 1994 issue of *GSA Today*.

During the first quarter of 1994, SAGE program activities focused on three major projects: (1) Project Earth S.E.E.D., (2) PEP/In-STEP, and (3) Project Rise. Each of these projects is described below.

1. Project Earth S.E.E.D.

Project Earth S.E.E.D. (Science Education Enhancement and Dissemination) is the Geological Society of America's national program for teacher enhancement programs are sustained or replicated following termination of their original program funding, and few have been co-planned or co-directed by K-12 teachers. The primary purpose of Project Earth S.E.E.D. is to catalyze the development of multiple, high quality, earth science teacher enhancement programs.

To create multiple new programs, Project Earth S.E.E.D. will recruit, train and support twenty-four teacher enhancement project director teams during the next four years. Each three-person team will include at least one master K-12 earth science teacher and one earth scientist or science educator. Each team will participate in a three-week summer workshop, extensive program planning and development back in their own regions, and a six-day workshop during the subsequent summer.

Over a two-year period, each team will: (1) increase their knowledge of teacher enhancement program components, effective pedagogical practices, science education resources, and systemic reform efforts, (2) enhance their leadership, partnership, and project management skills, and (3) design, develop, and implement a sustainable earth science teacher enhancement program.

Each of the programs catalyzed by our project will: (1) enhance teacher substantive knowledge in the earth sciences, (2) enhance teacher knowledge of teaching techniques, (3) foster teachers' positive views about science and science teaching, (4) support systemic reform efforts at the state or local level, and (5) enhance student interest and understandings in the earth sciences. Approximately 2000 teachers will be directly served by these new programs during the next six years. *Program Status = Planning Phase. Proposal submitted to NSF April 1, 1994.*

2. Partners for Excellence Program (PEP)/Involving Scientists and Teachers in Educational Partnerships (InSTEP)

The Partners for Excellence Program is designed to bring together teachers, students, parents, and earth scientists to help them form effective long-term educational partnerships. Partners for Exellence is currently a joint project of GSA and the National Earth Science Teachers Association. Additional organizations within the earth and space science communities have been invited to participate in this effort. There are currently 762 Partners for Excellence. The objectives of the survey are to ascertain the current level and types of partnering being done, the needs of partners, and how SAGE can address these needs.

In-STEP seeks to strengthen PEP and other science education partnership programs by creating a training and support program for partners. To achieve this objective, GSA is developing collaborations with the National Science Resource Center, the American Physical Society, the Department of Energy, the Colorado School of Mines, Hewlett Packard, the Colorado Alliance for Science, and other organizations. Specific objectives include: (1) the development of teams of Partner Resource Agents who will in turn be able to train other partners, (2) support of systemic reform efforts at the school district level, and (3) development of a nationwidde system of locally controlled partnerships. During the first phase of this project, we are planning to develop pilot partnership programs with selected school districts in Colorado and California. InSTEP training will emphasize critical thinking, hands-on activities, real world scientific investigations that cut across traditional discplinary boundaries, and systemic reform efforts at the state and local level. Partners will also learn about effective pedagogical techniques such as cooperative learning, guided discovery, and concept mapping. *Program Status = Development Phase.*

3. Project RISE

Teachers and students often find themselves isolated from the excitement of science. In traditional science classrooms, students read their texts, listen to lectures, do prescribed cookbook-style lab exercises, memorize facts, and take multiple choice tests to see how well they have mastered the material. Students in classrooms with teachers who believe in the importance of active, integrated, hands-on science often fare no better because their programs are constrained by school curricula which fractionate science into narrow subject areas. As a consequence, rather than developing global views of science, scientific processes, and scientific thinking, students and teachers alike frequently perceive science as a disconnected assortment of boring, difficult facts which are irrelevant to their daily lives.

Project RISE (Resources for Integrated Space and Earth Sciences) seeks to change these perceptions and to enfranchise all students and teachers in the study of science by providing materials and training to support dynamic teaching and learning in earth and space sciences. The Project RISE materials will emphasize strong connections between science and students' own experiences and will employ a variety of methods for "knowing" and "doing" science. The vitality and relevancy of earth and space sciences will be demonstrated through activities which help students probe real-world issues, challenges, and decisions facing Earth's citizens. Holistic views of science will also be encouraged by Project RISE's interdisciplinary approach which de-emphasizes subject area boundaries both within sciences and between science and non-science. The training that teachers will participate in before receiving Project RISE materials will not only familiarize them with individual activities, but will also promote interactive, interdisciplinary use of Project RISE materials.

Project RISE is modeled after Project WILD, National Project WET, Project Learning Tree, and Project WILD Aquatic. Project RISE, like the older national projects, is intended to help student learn how to think, not what to think. Over the last decade, Project WILD alone has reached over 20% of the country's K-12 teachers and millions of their students. Project RISE has a similar audience in mind. *Project Status = Planning Phase.*

Other GSA Education Projects

The Earth Appreciation Project (a joint GSA/National Park Service project)

GSA is currently exploring the development of a pilot program to train and support park rangers, interpreters, and local K-12 teachers in the geology of Canyonlands and Arches National Parks. The goals of this program are to enrich the experiences and scientific understandings of park visitors and park personnel. Initial contacts have already been made with NPS personnel in Arches and Canyonlands National Parks. If the pilot program is successful, the program will be expanded to other national parks as resources and interest permit. *Program Status = Exploration Phase.*

Colorado Earth and Space Sciences Resources: A Director for K-16 Educators

During the past year, GSA has worked with the American Geological Institute (AGI) to develop a National Earth Science Education Resource Directory. The first edition of this Directory will be published by AGI in May 1994. GSA is now working with Colorado organizations and teachers to develop a Colorado Supplement to this Directory. Our goal is to provide Colorado teachers (K-16) with information on earth and space resources that are locally relevant (e.g., field trips, regional curricula, local resource centers, etc.). Pending funding, the first edition of the Colorado Directory is planned for publication in the fall of 1994. If the Colorado template is successful, we will initiate similar directory development programs in other states. *Project Status = Development Phase.*

Project Earth VIEW (GSA/Durrell Slide Sets)

In 1993, Richard and Lucile Durrell donated 6,000 slides to GSA, and Albert Copley donated 1200 slides. We plan to use these slides, plus future donations, to create high-quality, low-cost, slide sets for K-16 science educators. Pending funding, the first sets will be produced in late 1994. Slide sets will include descriptions of each slide as well as a teacher's guide and classroom activity extensions. Slide sets will also be used to supplement Project RISE materials. *Project Status = Development Phase.*

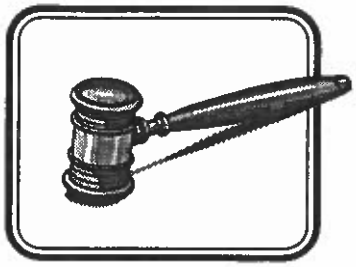
GSA Technology Training Facility

We have recently received funding to develop a state-of-the-art technology training facility at GSA Headquarters in Boulder. This facility will provide Colorado students with computer-based earth science research opportunities, and will provide earth scientists with ways to integrate computer/multi-media technologies into K-16 classrooms. *Project Status = Planning/Development Phase.*

Conferences

a. 1995. A follow-up to First GSA Presidential Conference: "Breaking Down the Barriers to Effective K-16 Earth Science Education." This conference will summarize the local and regional progress being made to break down the barriers to effective earth science education and examine new strategies to strengthen and expand these efforts. *Conference Status = Planning Phase.*

b. 1995-1996. Minority Access and Participation (MAP) Conference Series. Conferences will focus on the concerns, interests, and barriers faced by specific minority groups as we attempt to improve earth science education for all students. The goals of the conferences are to: 1) enhance earth science literacy for all K-16 minority students, and 2) encourage more minority students to pursue careers in earth science, space science, and technology fields. *Conference Status = Planning Phase.*



1994 ENGINEERING GEOLOGY DIVISION OFFICERS

GSA-EGD management board consists of five members; the Division officers, the chair of the preceding year, and one member-at-large serving a one year term.

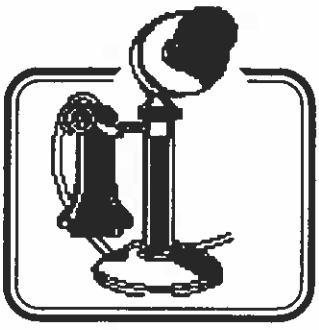
Chair, Rhea L. Graham
Science Applications International Corporation
2109 Air Park Road, S. E.
AlbuquerqueNM 87106
Phone: 505/842-7827, FAX: 505/842-7798

Chair-Elect, Michael W. Hart
10365 Barrywood Way
San Diego CA 92131
Phone: 619/578-4672

Secretary, John R. (Rick) Giardino
Department of Geography
Texas A&M University
College Station, TX
Phone: 409/845-7188, Fax: 409/862-4487
E-mail: geogc@triton.tamu.edu

Past Chair, Jerome V. DeGraff
Sierra National Forest
1600 Tolhouse Road
Clovis, CA 93612
Phone: 209/487-5640, Fax: 209/487-5155

Member-at-Large, Helen L. Delano
Pennsylvania Geological Survey
P.O. Box 8453
Harrisburg, PA 17105-8453, Phone: 717/878-6029



Call For Papers!

SINKHOLES & ENGINEERING/ ENVIRONMENTAL IMPACTS IN KARST CONFERENCE

The Fifth Multidisciplinary Conference on Sinkholes and the Engineering and Environmental impacts of Karst TM will be held April 2-5, 1995, in Gatlinburg, TN, gateway to the great Smoky Mountains National Park. Dr. Andrew Merritt, an internationally recognized Engineering Geologist who has worked on dams and tunnels in karst terrain over the globe, will be th banquet speaker. A field trip emphasizing the engineering geology of karst in east Tennessee will be led by Mr. Harry Moore, Engineering Geologist for the Tennessee DOT. Papers are invited from engineers, geologists, hydrogeologists, geographers, planners, and all interested parties dealing with applied science and engineering in karst terrain. International contributions are especially encouraged. A special session on "Governmental Regulations Specific to Karst Terrain" is being organized. Deadline for receipt of abstracts will be September 2, 1994. Abstracts and further requests for information should be sent to: Dr. Barry F. Beck, P.E. LaMoreaux & Associates, Inc., Box 4412, Oak Ridge, TN 37831; or telephone (615) 483-7483 and ask for a meeting brochure.

This meeting is cosponsored by the Institute for Geotechnology of the University of Tennessee, the Tennessee Section of ASCE, the Karst Waters Institute, and P.E. LaMoreaux & Associates, Inc.

ROBERT FERGUSON LEGGET

Robert, at 89 years, had been up to his usual spate of activities last week, delivering a lecture and in communication by telephone. On Sunday 17 April his elder sister Lucy called from Lancaster, UK, and upon not receiving a response, placed a call to Robert's neighbors, who found him unconscious of a stroke. He died at Riverside Hospital, Ottawa.

Robert's last employment was as Director, Division of Building Research, National Research Council of Canada, from which he left in 1969 to undertake an unusually active and productive retirement. He was a Canadian firstly, a North American secondly, a Scot by the genes, a Liverpudlian by birth and a grand engineering geologist by all accounts. Robert came his geology through civil engineering and was our greatest promoter and most humbly-elegant practitio-

ner. Robert was one of the handful of 1947 organizers of the Engineering Geology Division and his presidency of The Geological Society of America (1966) was an honor in itself, as his earned degrees were in civil engineering! Robert would be "Mr. Legget" on his telephone calls, considering his BS and MS formal education, though the professional world knew him as "Dr. Legget", the result of general respect for his knowledge and service to the profession, and for the several honorary doctorates accorded him.

Robert was influential in the Association of Engineering Geologists though not as an office holder, and mainly from behind the scenes, as a sought after counselor. Robert's influence lead the Board of Directors to create the AEG "Cities of The World" Bulletin series in 1982. Robert was author or editor of six standard engineering geology volumes, including his first book, *Geology & Engineering* (1939, 1962, and 1988), *Soils in Canada* (as editor, 1965), *Cities and Geology* (1973), *Glacial Till; An Interdisciplinary Study* (1976), *Geology Under Cities* (editor, GSA/EGD Review Volume V, 1982), and *Handbook of Geology in Civil Engineering* (1982). Two of his many papers are especially valuable references to engineering geologists; *Soil, Its Geology and Uses* (Presidential Address, GSA Bulletin, v. 78, 1967) and *Geology and Geotechnical Engineering* (Terzaghi Lecture, Proceedings, ASCE, Journal of Geotechnical Div., v. 105, 1977).

Robert served the American Society of Civil Engineers in many ways, including acting as creator of the Joint Committee on Engineering Geology, as the ASCE Terzaghi Lecturer in 1976, and was holder of the CAN-AM award for North American Cooperation in engineering. As a historian, he wrote precedence and past-accomplishments into all of his works, and authored several full books detailing the accomplishments of early Canadian civil engineers, in exploration and in construction of large works. These are but a drop in the bucket of Robert's professional contributions. His 1993 Christmas card was in the usual Robert tradition, a historical photo with strongly hand caligraphied caption and salutation, in Old English.

How grand and useful was his mark...

Allen W. Hatheway
Rolla, Missouri

ENGINEERING GEOLOGY

Many geoscientists practicing as engineering geologists view their specialty as including environmental geology. Others do not believe that environmental geology is part of engineering geology. The AGI Glossary of Geology, third edition, defines environmental geology as "The application of geologic principles and knowledge to problems created by man's occupancy and exploitation of the physical environment." Engineering geology, according to the Glossary, is "Geological sciences as applied to engineering practice, especially mining and civil engineering." The Association of Engineering Geologists notes that engineering geology is geologic work that is relevant to engineering, environmental concerns, and the public health, safety, and welfare. The AEG goes on to define engineering geology as the discipline of applying geologic data, techniques, and principles to the study both of a) naturally occurring rock and soil materials, and surface and subsurface fluids; and b) the interaction of introduced materials and processes with the geologic environment, so that geologic factors affecting the planning, design, construction, operation, and maintenance of engineering structures (fixed works), and the development, production, and remediation of ground-water resources, are adequately recognized, interpreted, and presented for use in engineering and related practice.

After years of debate, the Engineering Geology Division of the Geological Society of America voted in 1993 to change its name to Environmental/Engineering Geology Division. This decision has been submitted to the GSA Council for approval.

The possibility of evolving the quarterly Bulletin of the Association of Engineering Geologists into a journal of applied geology to be jointly published by AEG and GSA is also being discussed. The issues include professors receiving credit for publishing research in the AEG Bulletin instead of the GSA Bulletin and publishing the joint journal monthly.

Activities related to the International Decade for Natural Disaster Reduction did not attract much attention in 1993. The Transportation Research Board Land-

slide Task Force has nearly completed its work on a revision of the 1978 Special Publication 176, Landslides: Analysis and Control. The Citizens' Guide to Geologic Hazards (1993, published by and available from the American Institute of Professional Geologists, Arvada, Colo.) provides understandable explanations of geologic hazard issues and has good reference sections.

Professional registration of geologists continues to be a topic of much discussion in several parts of the United States. A registration bill was defeated in Texas by engineers who argued that if geologists are licensed, work will be taken away from engineers. Plans are under way to introduce a registration bill in Missouri. Ordinances in states without geologist registration laws commonly require engineers to sign geologic reports. Some states, such as Oklahoma and Tennessee, have prohibited engineering geologists from using the word engineering in their titles because of the concern that the public will think they are offering to practice engineering.

The consulting practice of engineering geology focuses on three areas: new development~ repair and rehabilitation; and characterization and cleanup of contaminated soil and ground water. The recession has resulted in layoffs from large- and moderate-size firms. A number of the laid-off professionals have started private practices with relatively low overhead expenses. The impact on the profession is an increase in competition and a temptation to cut corners or take on tasks that are beyond the professional qualifications of staff to maintain profitability. Recognition of this situation prompted a symposium on ethics at the 1993 AEG annual meeting in San Antonio, Texas. The proceedings are available from the AEG. There is increased exposure to liability for mistakes and public scrutiny of behavior that can affect the entire profession.

Many large projects outside North America are being funded by the World Bank or the European Community. Investigation and design services on EC-funded projects must come from consultants within the EC. It remains to be seen if the opportunities for engineering geologist created by the North American Free Trade Agreement will balance the exclusions created by the EC. For engineering geologists, the cost of permitting major projects in the United States and Canada is resulting in opportunities that are primarily overseas.

Consulting activity that focuses on characterization and cleanup of contaminated soil and ground water has sparked change in the academic preparation of engineering geologists. Colleges and universities are altering traditional programs for geology majors to ensure that students are competitive for employment. Problems with new employee skill levels may arise from programs that add courses dealing with broad issues and generalized information at the expense of courses preparing students to do field geology.

The end of the Cold War has prompted a re-direction of the U.S. Department of Defense, from military buildup to environmental cleanup. This re-direction should create opportunities for engineering geologists. Increased competition for federal research dollars may provide an additional opportunity for engineering geology and other applied research in the geosciences.

JEFFREY R. KEATON
Association of Engineering Geologists; SHB AGRA Inc., 4137 S. 500 W., Salt Lake City, 841 23-1 399

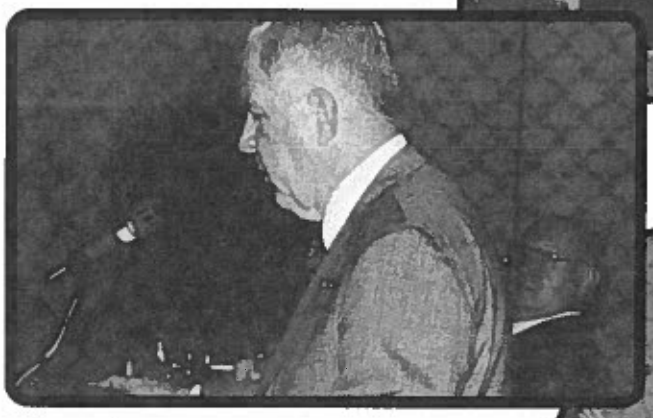
JEROME V. DEGRAFF **Engineering Geology Division, Geological Society of America; U.S. Forest Service, Sierra National Forest, 1600 Tollhouse Road, Clovis, Calif. 93611**

(From *Geotimes*, February 1994, p. 25-26.)

PHOTOGRAPHS FROM THE RECENT GSA/EGD LUNCHEON, BUSINESS MEETING & AWARD PRESENTATIONS, BOSTON

Don Deere, 1993
Distinguished Practice Award

Rhea Graham at the Podium



Dick Gray,
Citationist for
1993 Burwell Award

RichardW. Galster recipient,
1993 E. B. Burwell, Jr. Award

Jerry DeGraff presenting
Don Deere the DPA

1994 GSA Annual Meeting • Seattle, Washington • Local Committee

General Chairman Dr. Darrel S. Cowan
Dept. of Geological Sciences, Mail Stop AJ-20
University of Washington, Seattle, WA 98195
Office: (206) 543-4033, Home: (205) 524-2918
FAX: (206) 543-3836

Technical Program Chair Dr. Mark S. Ghiorso
Dept. of Geological Sciences, Mail Stop AJ-20
University of Washington, Seattle, WA 98195
Office: (206) 685-2482, FAX: (206) 543-3836

Field Trip Chair Dr. Donald A. Swanson
U.S. Geological Survey
clo Dept. of Geological Sciences, Mail Stop AJ-20
University of Washington, Seattle, WA 98195
Office: (206) 543-1094, Home: (206) 524-7764
FAX: (206) 553-5587

Environmental Coordinator Dr. David Montgomery
Dept. of Geological Sciences, Mail Stop AJ-20
University of Washington, Seattle, WA 98195
Office: (206) 685-2560, Home: ((206) 322-1397
FAX: (206) 543-3836

Guest Program Chair Mrs. Sarah Throckmorton
1923 Broadway East
Seattle, WA 98102
Home: (206) 329-7299

General Co-Chairman Dr. Stephen C. Porter
Quaternary Research Center, Mail Stop AK-60
University of Washington, Seattle, WA 98195
Office: (206) 543-1166, FAX: (206) 543-3836

Technical Program Co-Chair Dr. Thomas Dunne
Dept. of Geological Sciences
Mail Stop AJ-20
University of Washington
Seattle, WA 98195
Office: (206)543-7195, FAX: (206) 543-3836

Field Trip Co-Chair Ralph A. Haugerud
U.S. Geological Survey
c/o Dept. of Geological Sciences Mail Stop AJ-20
University of Washington Seattle, WA 98195
Office: (206) 553-5542
Home: (206) 5243899 FAX: (206) 543-3836

Education Coordinator Dr. Terry Swanson
Dept. of Geological Sciences
Mail Stop AJ-20
University of Washington
Seattle, WA 98195
Office: (206) 543-1923, FAX: (206) 543-3836

Guest Program Co-Chair Dr. Joseph Vance
1923 Broadway East
Seattle, WA 98102
Home: (206) 329-7299

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The Geological Society of America
3300 Penrose Place • P.O. Box 9140 • Boulder, Colorado 80301

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