The Engineering Geologist

THE GEOLOGICAL SOCIETY OF AMERICA

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

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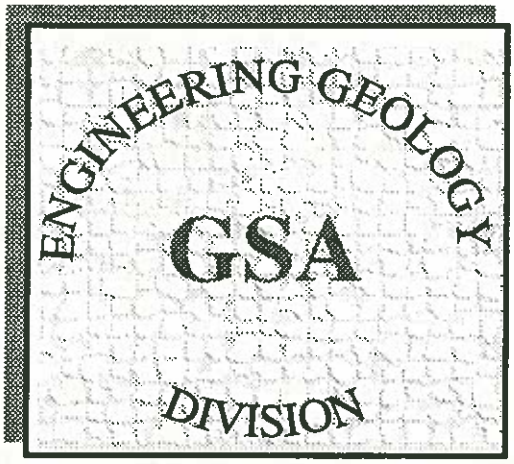

CHAIRMAN'S MESSAGE

It is nearly time for the annual meeting in Boston. This brings to mind another annual event--receiving our annual dues notice from GSA headquarters. It is a good time to consider what our purpose is in being a member of GSA and, more specifically, a member of the Engineering Geology Division.

It is easy to justify being a member of a professional society in your particular field of interest. Any journal or publication from such a society tends to have information readily applied to your interests. This is generally also true for technical sessions at regional or annual meetings. Membership and attendance at meetings provides a chance to make valuable contacts furthering you professionally. As engineering geologists, being part of an engineering geology society makes good sense for all these reasons.

As information seems to increase exponentially, we all realize the limitations of following journals in other fields. Only through membership in a broad-based geologic society like GSA can we hope to keep current with trends in other fields which may influence our own specialty. GSA is where those of us involved with assessing earthquake hazard can learn about new concepts in fault mechanics being explored by structural geologists. It is where those of us involved with subsurface exploration can encounter new techniques for solid earth exploration being applied by geophysicists. It is where those of us involved with landslide hazard mitigation can examine ideas about debris flow initiation mechanisms from studies by geomorphologists. These are only a few possibilities which might be anticipated--far more are likely from unanticipated exchanges of ideas.

Let me propose another reason for being in GSA---it makes it possible to be a member of the Engineering Geology Division. Membership in EGD gives you a chance to initiate technical sessions to further interchange of ideas between engineering geologists and other geologic specialties. It provides a strong link to the academic/research elements of the geologic community. It supports publications on engineering geology. The EGD has two specific publications series---*Reviews in Engineering Geology* and *Case Histories in Engineering Geology* ---which address current professional issues and research interests. As an EGD member, you can support the research of young professionals through the Student Research Award, recognize significant con-

tributions to the engineering geology profession through the E. B. Burwell, Jr. Award, and honor those who have distinguished themselves as engineering geologists or served the Society through the Distinguished Practice Award or the Meritorious Service Award. As a professional, it is important that we continue to grow in knowledge, share what we have learned, encourage beginning professionals, and recognize the contributions of our colleagues.

So, let me urge you to make sure you renew your membership in the Geological Society of America. Let me also urge you to check the box for continued inclusion in the Engineering Geology Division. In fact, why not check the GSA Directory membership list for the names of friends and associates who are engineering geologists, but not on EGD's rolls? Ask them to consider being part of the Engineering Geology Division of the Geological Society of America, too!

My tenure as Chairman of EGD ends at the annual meeting in Boston. It is a year that has passed far too quickly. I look forward to seeing you at the Annual Meeting and continuing to serve the Division in the future.

Jerome V. DeGraff
Chairman

FELLOWS NEEDED

Last year at the annual meeting in Cincinnati, then-GSA President E-an Zen advised the Divisions of the Geological Society of America that the proportion of membership having the status of Fellow as quite low. It is unclear why there are fewer Fellows than might be expected. The dues for a Fellow are the same as for a regular Member. Perhaps, it is just a matter of not having time or knowing how to propose someone for fellowship.

To be advanced to Fellow, an individual must have made a significant contribution in professional service, research, or teaching. It was President Zen's contention that many GSA Members had made such contributions, but lacked the recognition their contribution deserved. It is probably as true for Members of the Engineering Geology Division as for any other Division. If you have a colleague who seems worthy of this distinction, why not give them their due and propose them for recognition as a Fellow in the Geological Society of America. Just contact headquarters for the forms.

1992 RICHARD H. JAHNS DISTINGUISHED LECTURER

Dr. Barry Voight (Pennsylvania State University) was the 1992 Richard H. Jahns Distinguished Lecturer. This is an award jointly sponsored by the Engineering Geology Division of GSA and the Association of Engineering Geologists.

"Predictions in Engineering Geology: Landslides, Volcanoes and Other Acts of God" was the title of Dr. Voight's lecture. The lecture focused on a scientific basis for the prediction of hazardous geologic events. This included consideration of near real-time forecasting issues, limitations of the current state-of-the-art, and the role of prediction within the wider field of hazard management.

Dr. Voight's lecture was an especially appropriate topic for a variety of reasons. Foremost among these are Dr. Voight's personal experience and expertise in this subject matter. It was also timely as a contribution to the International Decade for Natural Hazard Reduction. Finally, it was appropriate because the topic grew on Dick Jahn's work on the National Research Council "Geophysical Predictions" Panel in the 1970's and his long-standing view of geological hazard reduction as a subject worthy of serious study by engineering geologists.

Dr. Voight was able to make the lecture available over a wide area. Among his university visits were Bryn Mawr College, University of California (Santa Barbara), University of Illinois, North Carolina State University, Oregon State University, and the Washington University (St. Louis) to name a few. He also gave the lecture to a number of professional groups including the Philadelphia Geological Society, National Science Teachers Association (New York City) and the American Society of Civil Engineers (Seattle Chapter).

PROGRESS BY EGD STUDENT RESEARCH GRANTEES

Beginning in 1990, the Engineering Geology Division awarded a grant to a student undertaking Masters or PhD research in the area of engineering geology. The student is selected by the EGD Management Board from among candidates who have requested research support from the Geological Society of America. The ability to provide this support comes from the foresight of past EGD Boards who initiated and nurtured a 40th Anniversary Fund and the generosity of EGD members who contribute to make it a reality. Interest from this fund administered by the Geological Society of America Foundation permits the awarding of a $500 grant each year.

Enough time has passed to be able to share the progress of the 1990 and 1991 Student Research recipients with EGD members. The 1990 recipient was **Raymond Torres** at the University of California (Berkeley). In 1990, he conducted sprinkler experiments at a colluvium-filled hollow. The experiments simulated rainfall intensities of 25 mm/day and 75 mm/day. A total of 13,000 observations of resulting infiltration were made. It was found that infiltration is not entirely vertical and preferential flow paths occur in the unsaturated zone. Further analysis of this data together with other site information is being undertaken to determine the significance of this result to the overall hydrologic response mechanism. This would improve the model for unsaturated/saturated flow in colluvium-filled hollows and the understanding of how debris flows are initiated in these geomorphic settings. Mr. Torres continues to progress with this study.

The 1991 recipient was **Kevin Hayes** at Penn State University. He intended to conduct a study on fracture systems and fossil stress in the Allegheny Plateau. Mr. Hayes was forced to change his topic due to closure of the underground mine in his field area and their understandable lack of interest in the projects. He changed his topic to a study of how minesoil texture and physical properties influence macropore development. Ten reclaimed strip mines on the Allegheny Plateau will serve as sites for infiltration tests, dye experiments, and grain size analyses. These sites provide soils with sufficient variation to serve as a basis for comparison of macropore development and its relationship to texture and physical properties. The change in topic has necessarily delayed acquiring field study results and is still in progress.

It is hoped that future issues of *The Engineering Geologists* will include updates on Mr. Torres' and Mr. Hayes' research results and the progress of our 1992 and 1993 Student Award recipients.

U.S. ENGINEERING GEOLOGIST TO RECEIVE PRESTIGIOUS AWARD

The Executive Committee of the International Association of Engineering Geologists (IAEG) has selected **William R. Judd** for their most distinguished award, the Hans Cloos Medal.

Professor Judd was nominated by the U. S. Committee for the IAEG and the IAEG Executive Committee unanimously considered that the international reputation and merits of Mr. Judd for his eminent contribution to the advancement of engineering geology clearly justify the award.

This award, in honor of Hans Cloos, 1885-1951, a pioneer in the use of detailed measurements as a means of understanding geological structures, is given to engineering geologists who have gained an international reputation for their eminent contribution to the development and advancement of engineering geology.

The medal will be presented to Mr. Judd at the Opening Session of the 7th IAEG Congress in Lisbon, Portugal, September 1994.

A recipient of the Engineering Geology Division's Distinguished Practice Award, his 50-plus year professional career is a model of outstanding and distinguished service to the advancement of engineering geology. Mr. Judd's contributions include all phases of our profession - writing numerous papers and a great textbook; teaching; research; consulting; editor-in-chief for over 15 years of the only true international periodical on engineering geology; plus active participation in numerous engineering geology related technical societies. Some examples of his more significant contributions in engineering geology and rock mechanics are:

- "Principles of Engineering Geology and Geotechnics, "co-authored with D. P. Krynine. In print over 30 years and in its 15th printing, this book has outsold all other engineering geology books. Its wide distribution has influenced practice throughout the world.
- Initiated the Geological Society of America (GSA)-American Society of Civil Engineers (ASCE) Joint Committee on Engineering Geology and served as its secretary for 16 years.
- Initiated and chaired the first international conference on rock mechanics in 1963 ("State of Stress in the Earth's Crust").
- Initiated, organized, and selected the speakers for the first national conference of geologists and civil engineers in 1958 (reported in GSA Case Histories #3).
- First to propose (in print) the use of angle holes in exploring arch dams where the holes parallel the thrust lines and thus minimize difficulties in interpreting lab test results on the cores.
- Initiated formation of the North-Central Section of the Association of Engineering Geologists in 1968.
- Editor-in-Chief for 17 years of the only true international periodical on engineering geology ("Engineering Geology - An International Journal") and prior to that (1966-1971) editorial consultant on geosciences for American Elsevier.
- In 1976, the first geologist elected to the Executive Council of the U. S. Committee on Large Dams, and re-elected in 1980.
- First engineering geologist to serve on the U. S. Air Force Scientific Advisory Board (1964-1967).
- Critiqued contractors' proposals on subsurface based missile systems for U. S. Air Force Space and Missile Systems organization (1966-1970).
- Advised Department of Defense Advanced Research Projects Agency on certain earth science research projects (1968-1972).

Professor Judd's research includes in-depth correlations of rock properties; development of criteria for evaluating durability of riprap and breakwater stone; long-term performance of rock bolts; effects of earthquakes on underground openings; what happens to loess when it is surcharged and then saturated; and how to correlate lab test results with *in situ* performance (of geologic media).

His consulting work over the past 50-plus years on four continents has involved over 50 dams, 14 underground installations, (power plants, military facilities, etc.), innumerable miles of tunnels and canals and transmission lines, a dozen or more high-rise buildings and many residences, unstable slopes, rehabilitation of several unsafe dams, railroad bridges, groundwater depletion, and rad-waste repositories.

Professor Judd's publications include serving as author, co-author, or editor of seven books; a contributor to 21 books, 23 professional papers; 20 individually published professional reports; 17 U. S. Bureau of Reclamation reports; and dozens of consulting reports.

His numerous honors include Honorary Member of the Association of Engineering Geologists (AEG); the first American engineering geologist invited to present the Alex du Toit Memorial Lecture in South Africa and Rhodesia; and Special Award for "Outstanding Research and Contributions to Rock Mechanics," (1982), U. S. National Committee on Rock Mechanics, National Research Council.

The only other U. S. recipient of the Hans Cloos Medal is David Varnes in 1988.

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Newsletter of the EGD
Geological Society of America
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All items for the newsletter should be sent to M. L. Jennings, Department of Geography, Texas A&M University, College Station, TX 77843-3147.

Address changes should be sent directly to The Geological Society of America, 3300 Penrose Place, P. O. Box 9140, Boulder, Colorado 80301.

SPECIAL SESSION AT GSA "THE GREAT FLOOD OF 1993"

Boston meeting program chair Dick Holland suggested, and it was approved at JTPC to add a special session on Wednesday from 5:45 p.m. to 7:30 p.m. to discuss "The Great Flood of 1993." The magnitude of this flood over the historic flood level is so great that the time of exceeding that level was almost three weeks! To capture some of the technical aspects of these impacts, we will be having a video presentation and discussions of events of technical interest by GSA members and specialists in the U. S. Army Corps of Engineers Hydraulics and Geotechnical Branches in the St. Louis Division office. In addition there will be presentations by a geomorphologist specializing in the region and by a knowledgeable National Weather Service scientist. EGD Chairman-Elect Rhea Graham and Quaternary Geology and Geomorphology Chairman Stephen Wells are co-chairs of this special session which is co-sponsored by the Hydrogeology Division and Archaeological Geology Division and the two divisions of the co-chairs.

Please fax information about any work you are doing related to this special session to Rhea Graham at 505/842-7798; or call her at 505/842-7827. Home telephone number - 505/867-4596. If you have ideas for continuing this theme at the 1994 Seattle meeting, please contact Mike Hart who will be responsible for our EGD program.

INTERNATIONAL LAND RECLAMATION AND MINE DRAINAGE CONFERENCE

Pittsburgh Convention Center
April 24-29, 1994
Pittsburgh, Pennsylvania, USA

Pittsburgh will host the largest mine reclamation and mine drainage conference ever held in North America. The conference will simultaneously serve as the Third International Conference on the Abatement of Acidic Drainage and as the annual meetings of the American Society of Surface Mining and Reclamation, the Canadian Land Reclamation Association, and the International Affiliation of Land Reclamationists.

This unique joint conference is expected to attract well over 1,000 researchers, practitioners, and regulators from all over the world to learn how best to deal with such environmental issues as acidic mine water and reclamation of disturbed lands.

Presentations and workshops will be given by the world's experts on such topics as prediction and control of acid mine drainage, waste management, wildlife and habitat restoration, improving productivity of reclaimed mine lands, abandoned mined land issues (subsidence, fires, re-mining, etc.), regulatory and policy issues, etc. It is anticipated that 120-150 papers and 4-6 workshops will be presented. In addition, there will be an exhibit area with space for about 120 exhibitors, and field trips that conference participants can take to see the problems and their solutions at actual mine sites.

According to Dr. Kleinmann of the U. S. Bureau of Mines, which is helping to organize and sponsor the conference, this meeting has generated a tremendous amount of interest. "Based on the enthusiastic response we have received already, it is obvious that this event is timely. Issues such as the 1872 mining law, the re-mining of abandoned mine sites, the passive treatment of mine water and the potential benefits of incorporating flyash into mine reclamation efforts are all topical."

This joint conference will be co-hosted by the U. S. Bureau of Mines, the Office of Surface Mining, the Environmental Protection Agency, and the Tennessee Valley Authority, all of whom intend to use the meeting to facilitate information exchange and technology transfer.

For additional information contact: D. Lowanse or B. Kleinmann, U. S. Bureau of Mines, P. O. Box 18070, Pittsburgh, PA, USA 15236. Phone 412/892-6708 or Fax 412/892-4067.

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Eustasy: The Historical Ups and Downs of a Major Geological Concept

New GSA publication edited by Robert H. Dott, Jr., Department of Geology and Geophysics, University of Wisconsin, Madison WI 53706.

"Eustasy, or worldwide change of sea level, is a significant and complex concept, which had its historical beginnings in the flood myths of ancient civilizations. Seventeenth century sacred theories sought geologic evidence of Noah's Flood, and 18th century thought was dominated by neptunism's one-way eustatic fall. Nineteenth century geologists favored either repeated vertical movements of the earth's crust or of sea level. After years of study, scientists today realize that isolating an unambiguous eustatic signal from tectonic crustal changes is even more complicated than had ever been imagined. Understanding eustasy is important because possible greenhouse warming predictions warn of a sea level rise of as much as 30m due to the melting of the remaining Antarctic and Greenland ice caps.

Although eustasy has a long history, only recently has there been a revival of interest in it stemming from two events that occurred during the 1960s and 1970s. The Deep Sea Drilling Program provided abundant evidence supporting the Croll-Milankovitch theory of orbital forcing as a major cause of glaciations, of which eustatic changes are an important consequence. Simultaneously, the growth of seismic sequence stratigraphy provided compelling evidence of the apparent synchronization of major packages of strata on many, widely separated continental margins, which also implied many eustatic changes. This convergence of data from two different sources has made eustasy an active research topic in diverse scientific fields such as glacial geology, climatology, marine science, tectonics, stratigraphy, and petroleum exploration.

Because the renewed interest in eustasy is so widespread, the History of Geology Division of the Geological Society of America sponsored a symposium on the history of eustasy at its annual meeting in Dallas, Texas, in 1990. Its goal was to educate the geological community on the complex history of the concept, giving geologists a chance to learn from the mistakes of previous generations, rather than to repeat them. This volume presents a record of that symposium.

The nine chapters in this memoir discuss the history of eustasy, from the 18th century ideas of neptunism to the 20th century thought of Chamberlin and Grahau as well as the idea of cyclotherms, to the modern perspective of sequence stratigraphy. Finally, the last chapter ponders the difficulty of distinguishing an unambiguous eustatic signal from others reflected in the stratigraphic record.

GSA CONTINUING EDUCATION COURSES AT ANNUAL MEETING, BOSTON

CHARGING INTO THE FUTURE

1 - GIS and the Geosciences
2 - Urban Geology: Foundation for Inner City Health
3 - Asia: A Continent Built and Assembled Over the Past 500 Million Years
4 - Contaminant Hydrogeology: Practical Monitoring, Protection, and Cleanup
5 - Fracture Mechanics of Rock
6 - Alternative Pedagogies in Geological Sciences: A Workshop
7- Application of Sedimentological Information to Hydrogeological Problems
8 - Computer Mapping at Your Desk that Really Works
9 - Enviromental/Engineering Geology and Land-Use Planning--An Interface Between Science and Regulations
10 - Geochemisty and Stable Isotopes of Paleosols
11 - Isotope Hydrology
12 - Fractals and Their Use in Earth Sciences

Preregistration deadline is September 24. On-site registration will be $30 additional and based on availability.

BIOGRAPHICAL SKETCHES
Nominees for 1993-94
Engineering Geology Division Officers

CHAIRMAN

Rhea Lydia Graham was born in 1952 in Terre Haute IN. She received an A.B. in Geology at Bryn Mawr College in 1974, and an M.A. in Oceanography at Oregon State University 1977. A registered geologist and engineering geologist in Oregon, she is also a registered environmental assessor in the State of California, and a certified professional geologist in Indiana. She is currently employed as Director of the New Mexico Mining & Minerals Division (1991-present). Other positions she has held include Senior Scientist with Science Applications International Corporation 1988-1991; Regulatory Compliance Specialist, Ponderosa Projects, Inc., and private consultant in RCRA Compliance 1988; Senior Engineering Geologist, DEUEl & Associates, 1985-87 in Albuquerque NM. She has worked as Geologist, Forestry Sciences Laboratory, and as a private consultant in engineering geology from 1983-1984 in Corvallis OR; as an engineering geologist for CH2M Hill; 1978-1983 in Portland OR, and Geophysicist for EXXON 1977-1978 in Houston TX. Her professional society memberships include: Geological Society of America, Association of Engineering Geologists, New Mexico Geological Society, and AIPG. She is a past president of the new Mexico Section of AIPG, and has served on the NRC/NAS Committee on Ground Failure Hazards.

SECRETARY-TREASURER

John R. Giardino was born in Pueblo, CO in 1946, married with one daughter. He received a B.S. in Geology and Geography, University of Southern Colorado, Pueblo CO, 1969; M.A. in geography with a minor in geology, Arizona State University, Tempe, 1971; Ph.D. in geography with minors in geology and soils, University of Nebraska, 1979. He has been head of the Department of Geography at Texas A&M University, College Station TX 1989 to present. Rick has been editor of *The Engineering Geologist* since 1990; Chairman of the Publication Committee, EGD-GSA, 1989 to present; Editor, *Institute for Tertiary-Quaternary Studies Newsletter*, University of Nebraska, 1977. He has been a professor in the Departments of Geology and Geography at Texas A&M University 1989 to present. One of his most recent publications as co-editor with J. Vitek, "The Research Frontier & Beyond, Special Issue," *Proceedings of the 24th Binghamton Symposium in Geomorphology*, Elsevier. He has been a Fellow of the GSA since 1991; chair of the G.K. Gilbert Award Committee, Geomorphology Specialty Group of the Association of American Geographers (1992); member of the American Association of Petroleum Geologists 1982-present. His current address is Department of Geography, Texas A&M University, College Station TX 77843-3147. Fax 409/862-4487.

CHAIRMAN-ELECT

John D. Rockaway was born in 1938 in Cincinnati OH. He received his B.S. degree in Geological Engineering from the Colorado School of Mines in 1961 and his M. S. degree from Purdue University in 1963. Following two years of active duty with the U. S. Army Corps of Engineers, he returned to Purdue and received his Ph.D. in 1968. He joined the Department of Geological Engineering at the University of Missouri-Rolla in 1968 and was Chairman from 1981 through 1987. He is a member of the Association of Engineering Geologists, International Association of Engineering Geologists, National Water Well Association, and the Society of Mining Engineers. He currently is a member of the ASCE-GSA-AEG Committee on Engineering Geology and serves as Chairman of the Missouri Dam and Reservoir Council. He has been a consulting geologist on a variety of projects, chiefly related to investigation of geologic hazards and site selection studies. His research interests include seismic risk studies in the mid-continent area, coal mine stability studies, and development of programs in environmental geosciences for secondary education. His current address is: Department of Geological Engineering, University of Missouri-Rolla, Rolla MO 65401.

MANAGEMENT BOARD REPRESENTATIVE

Helen Louse Delano was born in 1953 in Bethesda MD. She received a B.S. in Geology, Tufts University, 1974; M.A. in Geological Sciences, State University of New York at Binghamton, 1979. Since 1980, she has been employed as a Geologist by the Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey, in Pittsburgh and Harrisburg. In 1979-80 she worked for the National Park Service on an Archaeological Survey of Cape Cod National Seashore. Her professional and research interests include landslides and landslide susceptibility, coastal erosion and bluff processes, Appalachian geomorphology, and geology and public policy issues. Professional society memberships and activities include: Geological Society of America, Co-chairman 1987 Northeast Section meeting, Burwell Award Committee 1993-1995; Association of Engineering Geologists; International Association of Engineering Geologists; Association for Women Geoscientists; Harrisburg Area Geological Society; Pittsburgh Geological Society (past-President). Her current address is Bureau of Topographic & Geologic Survey, P. O. Box 8453, Harrisburg PA 17105-8354.

ANNOUNCEMENT

NEW PUBLIC OUTREACH PROGRAM ON GEOLOGY AND THE ENVIRONMENT

The Geological Society of America's Institute for Environmental Education (IEE) is seeking individuals and organizations who may wish to participate in activities that heighten public understanding of geoscience as it relates to environmental issues.

IEE is presently developing a public outreach program to incorporate relevant geoscience in environmental decision making from the community to the national level, heighten comprehension of geoscience, and increase the efficiency and effectiveness of disseminating geoscience information for use by the public and decision makers.

The IEE approach involves several key steps:

1) to identify individuals and organizations who can contribute to meeting program objectives.
2) to identify local or regional environmental issues, and potential audiences and individuals who can benefit from the program, and
3) to develop theme sessions forums, and/or workshops in association with Geological Society of America Section meetings.

A network of individuals and organizations is now being formed to assist in meeting the objectives of the Public Outreach program. Persons interested in participating, suggesting individuals or topics, commenting, or simply learning more about this new program are encouraged to write to:

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