

The Engineering Geologist



THE
GEOLOGICAL SOCIETY
OF AMERICA

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

Volume 23, Number 1

March 1988

CHAIRMAN'S MESSAGE

ENGINEERING GEOLOGY DIVISION

It is the GSA Centennial Year and we have some promising developments.

Our objectives this year are, first, to enhance Engineering Geology as a profession and, second, to celebrate the GSA's Centenary.

The Engineering Geology Division's Management Board took the following actions:

1. To present an Anniversary Award in support of research in Engineering Geology.
2. To plan a Distinguished Lecture Tour in Engineering Geology.
3. To get younger people in our Division. As a first step, we reduced student dues to a nominal \$2.00.
4. To contribute two exhibits on the History of Engineering Geology for the Centennial Meeting.
5. To publish a Centennial Volume in Engineering Geology, titled Neotectonics in Earthquake Evaluation.

Additionally, we will continue our activities in the Division on the:

1. Engineering Geology Symposium for the Annual Meeting.
2. Engineering Geology Sessions at the Annual Meeting.
3. DNAG contributions.
4. Burwell Award.
5. Distinguished Practice Award.
6. Meritorious Service Award.
7. AEG, ASCE, NAS and other liaisons, representing Engineering Geology for the GSA.

This is going to be a busy year. And we hope to make it a professionally rewarding one for all of us.

ELLIS L. KRINITZSKY
for the Management Board:

Thomas L. Holzer
Jeffrey R. Keaton
Perry H. Rahn
Christopher C. Mathewson

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Geological Society of America
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15682 Leavenworth Sta.
Omaha, NE 68118

ANNOUNCEMENTS

Second International Conference on
Case Histories in Geotechnical Engineering
University of Missouri-Rolla

The Second International Conference will provide a forum for geotechnical, civil, structural and geological engineers and geologists to document case records in geotechnical engineering. Employees, geologists, scientists, teachers and other professional worldwide work initiated to contribute unpublished papers for publication in the proceedings and discussion at the conference.

Conference dates - June 1-3, 1988
Guest Speakers will be: Technical Tour 4-5, 1988

Bengt B. Broms, "Stability of large Diameter Cellular
Conferrdams in Soft Clay"

George F. Sowers, "Tectonic Residual Stress, Fractures
and Failure"

G.W. Clough, "Review of River Bank Stability
Processes in Stabilizing Measures"

John Ramage, "Lipari Landfill: Leachate
Containment System-Geotechnical
Considerations"

W.D. Liam Finn, "Analysis in Soil Dynamics: Status
of Verification"

Harry B. Seed, "Case Study of a High Earth and
Rockfill Dam"

Themes for discussion will be:

1. Case Histories of Geotechnical and Hydrological Management of Solid, Hazardous and Radioactive Wastes
2. Case Histories in Geological Engineering and Rock Mechanics
3. Case Histories of Dams, Embankments and Slopes
4. Case Histories of Geotechnical Earthquake Engineering and Soil Dynamics

5. New Solutions to Traditional Geotechnical Problems (Case Histories)
 6. Case Histories of Soil Structure Interaction
- If you have not already registered, contact

SECOND INTERNATIONAL CONFERENCE
111 E R L
UNIVERSITY OF MISSOURI-ROLLA
ROLLA, MISSOURI 65401-0249 U.S.A.

CALL FOR ABSTRACTS

SYMPOSIUM ON REMOTE SENSING IN GEOLOGY AND ENGINEERING:
NEW ADVANCES AND APPLICATIONS

31st Annual Meeting of the Association of
Engineering Geologists
October 18-19, 1988
Kansas City, Missouri

A symposium on Remote Sensing in Geology and Engineering will be held in conjunction with the 31st Annual Meeting of the Association of Engineering Geologists. The symposium is being sponsored by the Joint ASCE/AEG/GSA Committee on Engineering Geology, the Engineering Applications Committee of the American Society of Photogrammetry and Remote Sensing, and ASTM, Section D-18.01.03, Remote Sensing Committee. The objective of the symposium is to provide a forum for presentation of new advances in theory, technology and applications to engineering site and material characterization.

Abstracts not exceeding 2 pages in length must be submitted by February 15, 1988 to:
Dr. Richard C. Kent
Chairman, Organizing Committee
P. O. Box 30664
Walnut Creek, CA 94598
Phone: 415-933-2250 or 415-934-5902

The authors will be notified of acceptance by March 15, 1988. Papers not exceeding 16 pages in length will be due for review on May 15, 1988. Papers in final format for publication in conference proceedings will be due August 1, 1988.

WATER RESOURCES RESEARCH AND DOCUMENTATION CENTRE
(WARREDOC)
ITALIAN UNIVERSITY FOR FOREIGNERS
PERUGIA, ITALY
AND
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS, U.S.A.

INVITATION TO
INTERNATIONAL WORKSHOP ON NATURAL DISASTERS IN
EUROPEAN-MEDITERRANEAN COUNTRIES

AT
WARREDOC
Villa la Colombella
06080 Perugia, Italy

June 27 to July 1, 1988

INTRODUCTION

Flash floods, landslides, earthquakes, droughts and to a lesser extent volcanic activity, are natural events common to all Mediterranean countries in Europe and in the United States. Italy, in particular, has been very active in organizing the study of such natural occurrence with the formation, under the National Research Council, of the National Group for Prevention of Hydrogeological Disasters. Similar groups dealing with volcanology and earthquakes exist.

This effort is paralleled in the United States with the development of National Science Foundation's program on natural and Man-made Hazards and the long standing national interest on earthquake problems.

The present Workshop is to provide a forum to exchange ideas on scientific progress and needed research effort to control natural disasters in Europe (Mediterranean countries) and the United States. The meeting aims to identify common problems and interests that will guide research in the next five years and hopefully lead to transatlantic cooperation in these very important issues.

The natural disasters to be addressed in this Workshop are earthquakes, floods, droughts, and landslides. The participating countries would be Spain, Portugal, Greece, France, Yugoslavia, Italy and United States.

SPONSORSHIP

National Science Foundation, U.S.A., and the National Research Council of Italy through the National Group for the Prevention of Hydrogeological Disasters.

CONTACT ADDRESSES

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Centro Studi Villa La Colombella
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Perugia, Italy
Telephone: 39-(0) 75-6919326, 6919734
Telex: 66279 UNSTRA I

Professor Rafael L. Bras
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Massachusetts Institute of Technology
Cambridge, MA 02139
U.S.A.
Telephone: 617-253-2117
Telex: 921473 MITCAM

EGD Is Exploring Feasibility
Of Sponsoring Lecture Tour

The EGD Management Board is examining the feasibility of sponsoring an annual lecture tour by an engineering geologist. The tour would consist of visits primarily to academic institutions in North America. Its purpose would be to expose geology majors to career opportunities in the non-mineral and non-energy parts of applied geology. The preliminary plan is to request host institutions to pay for living expenses during each visit. The division would pay for travel expenses. The division is also planning to support visits to a few institutions where funding for living expenses is unavailable. If you have any strong recommendations or opinions about initiating such a tour, please contact Thomas L. Holzer at the U. S. Geological Survey (MS 977), 345 Middlefield Road, Menlo Park, California 94025. His phone number is 415/329-5637.

SLOPE HAZARD INVESTIGATION TRIPS: A CELEBRATION

The tenth annual slope Hazards Investigation Trip will be led by Catherine Hickson of the Geological Survey of Canada in the Mount St. Helens area of Washington State. This trip will focus on proclastic flows and surges, debris torrents and slides which resulted from the 1980 volcanic eruption and its creation of an active and unique sedimentary environment. The trip is tentatively planned for the weekend of September 17 and 18, 1988; details will be provided in an announcement to be mailed soon. In anticipation of the tenth annual trip, a retrospective view of slope hazardist activity is in order.

The first slope hazards trip was organized in 1979. The continuing quality and informal tone of the trips has been sustained by energetic leadership and attendance by enthusiasts. Landslides and snow avalanches are viewed from the varying perspectives of geologists, engineers, geographers, foresters and planners. Field discussions generate insight into natural processes and complex human and political issues.

The first, third and fourth trips were held in the dryland interior of British Columbia and investigated slides and flows in till, glacio-lacustrine silts and complex sequences of glacial drift as well as weathered volcanic rocks. The second trip, and part of the seventh, studied soil failures triggered by natural processes and intensive logging activity in the wet climate of northern Vancouver Island and portions of the southern Coast Range. Debris torrents assumed tragic importance in British Columbia in 1981. The fifth through eighth trips observed the effects of debris torrents and floods and related protective works. The fifth, sixth, ninth and tenth trips studied snow avalanches as well as very large landslides and rock avalanches in the Hope, Pemberton-Meager Creek, Chilliwack and Rocky Mountain areas. The First Cordilleran Slope Hazards Workshop was organized by Professor Michael Roberts of Simon Fraser University. At this one day program of informal papers and energetic subsequent discussions, the group gained its identity, confirmed its acronym and began the tradition of shanghaiing the next year's trip leader. Members of that workshop must have been especially

persuasive because Don Howes led the second slope hazards trip only three months later!

Atmospheric conditions have never restricted attendance. The 1985 trip was held in weather that one participant said "forced him to redefine the word rain". The 1984 event had benign weather while several major landslide and flood events were being triggered by an approaching frontal system in the Coast Ranges about 100 km to the west. Some of the effects of this storm event were viewed in the 1986 field trip. The group invariably recovers from the cold with an ample evening meal, cash bar and subsequent discussions. Participants may also offer entertaining diversions for family members and open-minded hotel personnel.

A chronology of the Slope Hazard Investigation Trips and or leadership roster will be presented to honor the concept and its supporters. We look forward to our second decade!

LEADER AFFILIATIONS

Drs. Catherine Hickson, John Clague, Steve Evans and Lionel Jackson: Geological Survey of Canada.

Dr. Geri Eisbacher: University of Karlsruhe, Germany.

Dr. Michael Roberts: Department of Geography Simon Fraser University.

Don Howes: British Columbia Ministry of Environment.

Rob Buchanan: British Columbia Ministry of Highways.

Dr. W. H. Mathews: Department of Geology University of British Columbia.

Drs. J. M. Ryder and Michael Bovis: Department of Geography, University of British Columbia.

Dr. Peter Schaerer: Snow Avalanche Section, National Research Council.

Mike Miles: M. Miles and Associates Ltd.

Doug VanDine: VanDine Geological Engineering Services.

Denny Manard: Westland Resource Group

Peter Jordan: P. Jordan and Associates.

Rod Smith: Westbay Instruments Ltd.

Dr. D. Cruden: Department of Civil Engineering, University of Alberta

Dr. Oldrich Hungr and Bob Gerath: Thurber Consultants Ltd.

CALL FOR SHORT COURSES

We need suggestions for possible short courses that can be sponsored by the Engineering Geology Division. Anyone with ideas for such short courses should communicate them to our chairman.

FIELD TRIP ANNOUNCEMENT

MAJOR LANDSLIDES AND GEOTECHNICAL CONSTRUCTION PROBLEMS IN THE MOUNTAINS OF COLORADO

A two day field trip will examine geologic hazards and engineering geology of landslides, rockfall areas, debris flows, and highway construction in hazardous canyons of western Colorado as part of the 1988 GSA meeting in October. Highlighting the trip are stops at the

MEMBERSHIP IN THE INTERNATIONAL ASSOCIATION OF ENGINEERING GEOLOGY

The International Association of Engineering Geology invites you to become a member. The Association publishes a semiannual journal--"Bulletin of the International Association of Engineering Geology"--and sponsors field excursions and symposia on timely topics worldwide. For example, in 1988 the IAEG will sponsor symposia on "Engineering geology as related to the study and preservation and protection of ancient works, monuments and historical sites" in Athens, Greece, and "Engineering geology of the shelf and continental slope of seas and oceans" in Tbilisi, USSR. In 1989, the U.S. Group of IAEG will sponsor several sessions at the International Geological Congress in Washington, D.C. The recent addition of an editorial board to the Bulletin qualifies it as a "refereed journal."

Annual dues are \$15 US, payable to the U.S. Committee for IAEG. If interested, please complete the membership form below.

Last name (Block letters): _____

First name: _____

Address: _____

(Bulletin will be sent to address specified above)

applies for membership in the IAEG as an individual member ☐

as an associate member ☐

Payment by check to: R. W. Fleming
U.S. Geological Survey
Box 25046, M.S. 966
Denver, CO 80225

Please make check payable to:
U.S. Committee for IAEG

Signature of the applicant

Date: _____

ANNUAL MEMBERSHIP SUBSCRIPTION

Individual members	15 U.S.\$
Associate members (Institutions)	60 U.S.\$

FIELD TRIP ANNOUNCEMENT (continued)

Dowds Junction Landslide Complex near Veil, Colorado, a tour of geotechnical aspects of interstate highway construction through Glenwood Canyon, and a stop at the giant 180 million M3 Muddy Creek Landslide Complex which reactivated in spring 1986.

The trip heads west out of Denver October 28, 1988, on Interstate 70. Stops the first day include rockfall and debris avalanche sites in Veil valley, the Dowds Junction Landslide Complex, and several stops to examine geotechnical aspects of highway construction in Glenwood Canyon. The evening will be spent in Glenwood Springs, where many fine restaurants and the world famous Glenwood Hot Springs pool are within walking distance of hotel accommodations.

The second day follows a route southwest along the Roaring Fork and Crystal River valleys, over McClures Pass, and down East Muddy Creek with stops at the Muddy Creek Landslide Complex. The giant, active slide complex began rapid movement in April and May 1986, forming a 14ha backwater lake and disrupting 2 km of State Highway 133. The slide is still creeping into the valley. The trip continues down the North Fork of the Gunnison River, with stops at two large landslides which have disrupted highway and fish-hatchery facilities, then swings north, returning to Interstate 70 via Grand Junction. The afternoon will include stops at a large, recurrent hazardous rockslide along I-70 in DeBeque Canyon, and at a sight where prehistoric debris-flows of gigantic size cross-

ed the Colorado River near Rifle. An optional side trip up Roan Creek to visit a 20 million m³ landslide-earth flow that was emplaced overnight in 1985 may be included if time permits. The return to Denver will be via I-70.

Please sign up early for this trip, as space will be limited to 45 participants.

SAN JOSE STATE UNIVERSITY
School of Science . Department of Geology
One Washington Square . San Jose,
California 95192-0102 . 408/277/2385

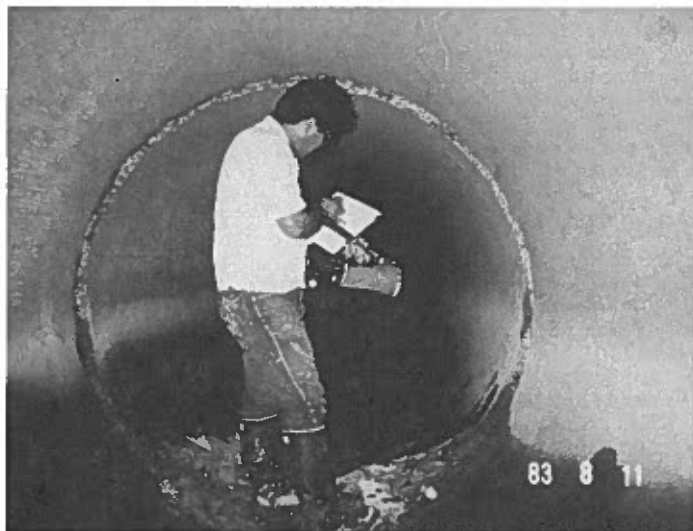
PROPOSED SYMPOSIUM FOR THE 1988 AEG ANNUAL MEETING TO BE ENTITLED "COMPUTER SIMULATION AS A TOOL IN GROUNDWATER INVESTIGATIONS"

The use of computer simulation of groundwater flow and solute transport has increased greatly in the last few years, particularly as a tool in contaminant investigations and in the planning of aquifer remediation. A variety of well-documented, verified models are readily available, often with pre- and post-processors to facilitate data input and result display. The problem can often be determining when computer modeling is appropriate, which model can best handle a particular case, and how to evaluate the validity of the results. This symposium will address these issues through discussion papers and case studies. While many of the papers will be invited, additional contributions on these themes are solicited.

Sincerely,

Dr. June A. Oberdorfer

FEATURE SECTION



CAPTION: Compression failure at joint in 72-inch diameter water pipeline at the toe of the Penitencia Creek Landslide. The pipeline was built in 1964. About 5 inches of axial compression accumulated before leakage developed in May, 1983. Nearby pipeline joints were largely unaffected. In 1984 collapsible couplings were installed on this and two adjacent pipelines. These couplings have compressed 0.5 to 0.9 inches/yr. since installed.

One of the goals of the National Research Council Committee on Ground Failure Hazards,* was to foster communication and information exchange in the United States and abroad through publication of a news letter and through symposia, conferences and workshops. As a contribution to this 'esprit-de-corps', the following article is featured in this edition of our news letter. Comments should be addressed to its author, Robert E. Tepel, Santa Clara Valley

Water District 5750 Almaden Expressway, San Jose, California 95118 (408/265/2600/355.

THE PENITENCIA CREEK LANDSLIDE, SANTA CLARA COUNTY, CALIFORNIA: A BRIEF DESCRIPTION AND A REQUEST FOR INPUT FROM THE READERS

The Penitencia Creek landslide is a 200-acre (81 - hectares) landslide complex at the base of the west-facing slopes of the Diablo Range in the

PENITENCIA CREEK LANDSLIDE (continued)

eastern part of the City of San Jose, California. About 200 houses have been built on the lower portion of the landslide; the upper part is mostly open land. The Santa Clara Valley Water District owns and operates the Penitencia Water Treatment Plant, a 40 MGD (150,000 cu. m/day) facility which is located near the center of the landslide. The total value of public and private improvements on the landslide is estimated to exceed \$100,000,000.

Data from inclinometer borings and surface surveys show that, since 1972, the landslide has typically moved from $\frac{1}{4}$ to $\frac{1}{2}$ inches (6 to 38 mm) a year in creep fashion. Other historical data suggest that creep movement has been occurring since as early as 1954. Preliminary studies suggest that the rate of movement varies with seasonal rainfall. Surveys done shortly before and after the Morgan Hill, California, Earthquake of April 24, 1984, indicate that several points on the surface of the landslide moved downslope 3 to 13 mm as a result of the earthquake. Landslide creep movement has damaged streets, sidewalks, buried utilities and a few houses. (See photo).

The main body of the landslide is roughly 3,500 feet (1,070 m) wide and 2,200 feet (670 m) in the upslope-downslope direction. Elevations range from 240 feet (73 m) at the toe to 570 feet (174 m) near the top of the main body. Overall slopes on the main body of the landslide typically are in the range of $5\frac{1}{2}$ degrees to $7\frac{1}{2}$ degrees. Subsidiary(?) slides exist upslope of the main body, and there are adjacent, presumably separate, large landslides to the northwest. The main body of the Penitencia Creek landslide has developed in the non-marine Plio-Pleistocene Santa Clara formation, here mostly (about 60 to 70% of samples tested) moderately over-consolidated clayey deposits with minor gravel and sand. The remainder of samples tested as gravelly clayey sands. X-ray diffraction studies of the clay in the samples indicate that it is a smectite. This identification is also supported by electron micrographs.

The local geology is complex, involving local and regional faults just east (upslope) of the main landslide body; outcrops of serpentinite and the Berryessa formation (Cretaceous marine interbedded sandstone and shale) are also present upslope of the landslide. Geomorphic features of landsliding are subdued, suggesting that the time of original (and presumably greatest) movement of the landslide is several thousand to a few tens of thousands of years ago. No radio-carbon dates are available.

Barring greater complexity of the history of landslide movement than our present understanding enables us to envision, the maximum horizontal movement of the landslide should not be much greater than

about 1,000 feet (about 300 meters), and may indeed be only about half that much (or even less). We do not know how much of the total landslide movement can be attributed to the historically observed creep and how much can be attributed to what we assume is an original "rapid" failure involving substantial displacements.

Inclinometer data suggest that the principal basal failure surface is close to horizontal under much of the landslide. The landslide is moving under a broadly undulating failure surface which probably varies about 20 feet (6 m) above and below its average elevation over about three fourths of the area covered by the landslide. The maximum known thickness of the landslide, measured near its head, is about 240 feet (73 m).

Basic soils tests for samples at and near the basal failure surface provide the following data: average specific gravity, 2.73; average total density, 131 lb/cu ft. (2,000 kg/cu meter); average water content 18.7 percent; Atterberg limits for ten samples range in plasticity index from 29 to 58 percent; plastic limits for the same samples range from 15 to 21 percent; percent finer than 2 microns ranges from 25 to 49 percent; average activity of the clay is 1.37

The residual strength of the clayey Santa Clara formation material was initially investigated using large strain direct shear tests involving reversal of strain direction. These tests were performed on samples within 10 to 30 feet of the basal failure surface and suggest a residual friction angle of 15.8 degrees and a cohesion of 5.1 pse (35.2 kPa).

Consolidated drained triaxial shear tests were performed on eight samples considered representative of the material close to, if not coincident with, the basal failure surface. During axial loading, four samples developed bulge failures and four samples developed distinct shear planes. The minimum residual friction angle measured in the triaxial tests is 12.1 degrees, with zero cohesion.

The writers are interested in communicating with others who are dealing with the evaluation, analysis, and control of similar landslides on a practical basis, as well as with those who

PENITENCIA CREEK LANDSLIDE (continued)

suggest theoretical approaches to the analysis or understanding of such landslides. Questions we are seeking to answer include: 1) what is the best way to predict future rates of movement or changes in them?; 2) what effects will large earthquakes have on landslides?; 3) other than control of water input to the landslide, what actions can be taken to improve stability?; 4) have similar landslides been evaluated, analyzed for stability or controlled? What documentation or reports are available?; 5) how do our results and analyses to date compare with the work of others for similar problems?; 6) where is the landslide in its life cycle?; and 7) is there any way to determine when the historically creep behavior began?

We can provide further data to those involved in similar problems. For discussion of geological aspects, contact Robert E. Tepel, Engineering Geologist, Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose, Ca. 95118, telephone (408) 265-2600, Ext. 355. For discussion of soil mechanics aspects, contact Richard L. Volpe, Geotechnical Engineer, R. L. Volpe & Assoc. 110 Atwood Court, Los Gatos, Ca. 95030, Telephone (408) 356-5836.

* The National Research Council is the operating arm of the National Academy of Sciences and the National Academy of Engineering.

NOMINEES FOR DIVISION AWARDS SOLICITED

Nominees are needed for both the Engineering Geology Division's Burwell Award and Distinguished Practice Award. The E. R. Burwell, Jr., Memorial Award is made to an author or authors of a published paper which advances knowledge concerning principals or practice of engineering geology or in the related field of applied soil or rock mechanics where the role of geology is emphasized. The paper must have been published within the last 5 years. The Distinguished Practice Award

is made to an individual who has made exemplary contributions to engineering geology through a distinguished career.

Please submit nominations to the division chairman, Ellis Krinitzky (Waterways Experiment Station, P. O. Box 631, Vicksburg, MS 39180-0631), by May 15. For the Burwell Award, it would be helpful if you describe the merits of the paper that is the basis for the nomination. For the Distinguished Practice Award, please include information on the nominee's career that has prompted you to nominate the individual.

SOLICITATION FOR PAPERS FOR ANNUAL MEETING DIVISION SYMPOSIUM HAZARD REDUCTION IN THE 21ST CENTURY DENVER 1988

As all of you should know by now, the society is celebrating its centennial at the annual meeting in Denver, October 31-November 3, 1988. As part of this celebration, the division is organizing a special symposium entitled Hazard Reduction in the 21st Century. The purposes of the symposium are to review the progress made in the last 100 years in reducing the impact of hazardous geological processes and to identify some of the challenges that must be met if we are to reduce further the impact of natural and man-made hazards in the next 100 years. These hazards include earthquakes, volcanism, landslides, subsidence, coastal processes, and catastrophic flooding. The symposium will follow a newly instituted format by the society. It will be "open", that is, no more than 75% of the speakers will be invited. The purpose of this announcement is to encourage division members to contribute papers to this symposium. In addition to technical topics, papers on historical, philosophical, methodological topics are welcome.

The convenors of the symposium are Thomas L. Holzer and F. Beach Leighton. If you have further questions, you may contact either Tom (415) 329-5637 or Beach (714) 250-1421.

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UTAH GEOLOGICAL ASSOCIATION

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8	Henry Mountains Symposium, 1980, Hard cover, 33 papers & road log, 388 p.	45.00
10	Overthrust Belt of Central Utah, 1982, hard cover, 24 papers & road log, 335 pages	45.00
12	Geology and Energy Resources, Uinta Basin, 1985, 26 papers and road log, 342 pages	50.00
13	Geology Northwest Utah, southern Idaho and Northeast Nevada, 1985, soft cover, 20 papers and road log, 225 pages	40.00
14	Orogenic patterns & stratigraphy of North Central Utah & Southeastern Idaho, 1986 hard cover, 25 papers & road log, 332 p.	50.00
15	Thrusting & Extensional Structures and Mineralization in the Beaver Dam Mts., Southwest Utah, 1986, soft cover, 15 papers, 220 pages	25.00
16	Geozoic Geology of Western Utah sites for precious metals and hydrocarbon accumulations, 1987, hard cover, 40 papers & road log and Bibliography of Utah Geozoic geology - 1785 to June, 1987, over 400 pages	\$65.00

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GREETINGS AND SALUTATIONS

FROM YOUR NEW NEWSLETTER EDITOR

The success of your newsletter will depend not on your editor, but will rely on the interest of the Division membership and the interest in Division inter-communications. The newsletter need not be limited to our members. It could and should well serve to educate those in the political body serving our local communities and the nation as a whole on matters relating to engineering geology, geologic hazards, and education. I exhort you to send to me articles and information on a timely basis so that I can give you a NEWSLETTER of which you can have continued pride. Your editor is not an investigative reporter. Also, his typing resources are limited - so I apologize for this first edition of 1988 as to its format and style. Early submission of items for the newsletter will improve both.

A. G. Keene
Supervising Engineering Geologist
Department of Public Works
Los Angeles County, California
550 So. Vermont
Los Angeles, Ca. 90020



**THE
GEOLOGICAL SOCIETY
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