

The Engineering Geologist



THE
GEOLOGICAL SOCIETY
OF AMERICA

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

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February, 1971

MEETING IN MILWAUKEE SUCCESSFUL

Milwaukee was the scene of the 83rd GSA Annual Meetings, November 11-13, 1970. Here an estimated 3,500 earth scientists from all over the world gathered for the presentation of approximately 500 original geologic development and research papers and discussions.

The Engineering Geology Division elected its new officers as listed elsewhere in the Newsletter and conducted a symposium on the subject of *Geological Factors in Rapid Excavation*. A luncheon and business meeting, attended by more than 80 delegates, was held on November 11. David J. Varnes and Glenn R. Scott of the USGS received the E. B. Burwell, Jr., Award, and Dr. Len Obert of the Bureau of Mines presented a program titled "Rapid Excavation and the Role of Engineering Geology." Many thanks go to Dean Howard Pincus of the University of Wisconsin, Milwaukee, who very ably organized the symposium, the luncheon, and the general geology session, as well as a number of other activities.

Other areas which were of particular interest to engineering geologists were symposia and sessions dealing with man-made earthquakes, hydrogeology, seismology, and an interesting discussion titled "The Geologists' Responsibilities in Times of Environmental Crisis." The impact and role that the geologist should play in maintaining and improving the environment was emphasized in a number of sessions and was probably the most frequently discussed subject among those attending.

The meeting was not all work; an icebreaker cocktail party held at the Milwaukee Public Museum, the Annual Dinner, alumni cocktail parties, and tours of several of Milwaukee's famous breweries attracted many participants.

In summary, the 1970 GSA Annual Meetings were a total success and we look forward to seeing more engineering geologists at the 1971 meeting in Washington, D. C.

SECTION AFFILIATIONS AND MAILING LISTS

Many members, both new and old, have inquired as to affiliation with one or more of the Society's geographic Sections. The method is simplicity itself. All members are automatically recorded as affiliates of the Sections in which they reside. As affiliates, they receive all mailings for their own Section.

Any member interested in news of a Section or Sections other than his own needs only to ask Headquarters to put his name on the appropriate mailing lists. Meeting announcements and other mailings will come to him automatically until he cancels his request.

SCHEDULE OF 1971 SECTION MEETINGS

- March 18, 19, and 20---NORTHEASTERN SECTION MEETING
Hartford, Connecticut
Arthur A. Socolow, *Secretary*
- March 25, 26, and 27---CORDILLERAN SECTION MEETING
Riverside, California
Bates McKee, *Secretary*
- March 25, 26, and 27---SOUTH-CENTRAL SECTION MEETING
Lubbock, Texas
Melvin C. Schroeder, *Secretary*
- April 29 - May 1-----NORTH-CENTRAL SECTION MEETING
Lincoln, Nebraska
George R. Rapp, Jr., *Secretary*
- May 5, 6, 7, and 8-----SOUTHEASTERN SECTION MEETING
Blacksburg, Virginia
Henry S. Brown, *Secretary*
- May 13 and 14-----ROCKY MOUNTAIN SECTION MEETING
Calgary, Alberta, Canada
William K. Hamblin, *Secretary*

THE GEOLOGICAL SOCIETY OF AMERICA ENGINEERING GEOLOGY DIVISION

Meetings of Management Board were held
in Milwaukee
November 10 and 11, 1970

Program for 1970 Annual Meeting

A symposium on *Geological Factors in Rapid Excavation* was organized by H. J. Pincus, the Division's program representative.

It was decided that the symposium papers should be published and Howard Pincus was appointed as Associate Editor for their publication.

Election

Officers for 1971 are as follows: H. A. Coombs, Chairman; R. E. Gray, Chairman-Elect; N. A. Dixon, Secretary-Treasurer.

Membership and Finances

The Secretary reported that as of September 30, 1970, the membership of the Division was 927, and the balance on account with GSA Headquarters was \$1,716 51. At a similar time in 1969, the membership was 923, and the balance was approximately \$2,000.

Long-Range Planning Committee

The Chairman, W. H. Stuart, reported that the Committee has been working on a revision of the Bylaws and

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Meeting of Management Board...
(continued from page 1)

agreed to continue guiding this revision even though his term as Chairman is complete. H. G. Hershey, as Past-Chairman of the Division, will be Committee Chairman during 1971. R. W. Karpinsky's term on the Committee is completed. R. F. Legget was reappointed to the Committee so that the membership is as follows: H. G. Hershey, Chairman; W. H. Stuart; D. H. MacDonald; H. A. Coombs; R. F. Legget.

A. B. Cleaves suggested renewal of the Past-Chairman's Breakfast, and it was decided to have the Long-Range Planning Committee Chairman organize this affair.

Burwell Award

Recipients of the second Burwell Award are Glenn R. Scott and David J. Varnes for their paper, "General and Engineering Geology, United States Air Force Academy Site, Colorado."

S. S. Philbrick was appointed as Burwell Award Committee Chairman. As Chairman, he will represent the Division on the GSA Committee on Honors and Awards. E. T. Cleaves was appointed to a three-year term on the Committee.

Intersociety Committee on Rock Mechanics

H. G. Hershey reported that the GSA Council had, in the past year, decided that GSA's representative on the ICRM should be appointed by the Council. They welcome recommendations, however, from the Engineering Geology Division. Appointment to this Committee is for a three-year term.

Publications Committee

Chairman G. A. Kiersch reported that three manuscripts on "The Malpasset Dam and Failure" supplied by personnel of Coyne & Bellier, Consulting Engineers, Paris, were recommended for a separate offset publication to be sponsored by the Division.

A. B. Cleaves reported that he has seven or eight papers for the Tropic Regions Case Histories series.

It has not been possible to secure suitable papers for the Cold Regions Case Histories, and the Management Board agreed to drop this publication.

G. A. Kiersch was reappointed as Chairman.

L. B. Underwood was reappointed as Editor of *The Engineering Geologist*.

L. A. Brown was assigned to complete the work on the Reference List and update new material through 1970. He is to select any necessary Committee members.

A. B. Cleaves was reappointed Chairman of the Case Histories Committee.

Engineering Seismology Committee

Chairman D. S. Carder reported that *Engineering Geology Case Histories No. 8*, containing eight manuscripts on "Engineering Seismology: The Works of Man," was published in 1970. (See ad on page .) Editorial work and preparation of copy was done by W. M. Adams. Manuscripts for a second Case Histories on Engineering Seismology are being collected. Suggestions are invited.

Underground Excavations Committee

Chairman A. L. O'Neill reported that an International Advisory Conference on Tunnelling, sponsored and arranged by the Organization of Economic Cooperation and Development, was held in Washington, D. C., June 22-26, 1970. The Engineering Geology Division was officially represented on the U. S. Delegation by L. B. Underwood. Other members of the Underground Excavations Committee attending included D. U. Deere and A. L. O'Neill.

GSA Northeastern Section

Liaison Representative E. T. Cleaves reported that the Northeastern Section has been very active in environmental and engineering geology. A symposium on *Presentation of Geological Data for Environmental Planning Purposes* was held in Pittsburgh in February of 1970. Three sessions on environmental and engineering geology are being planned by L. Frankel, Program Chairman; G. A. Kiersch; J. W. Skehan; and R. Goldsmith for the 1971 Section meeting in Hartford, Connecticut.

The 1971 GSA Annual Meeting in Washington will have two engineering geology field trips. As Field Trip Committee Chairman, E. T. Cleaves has arranged with W. E. Davies to organize a trip on "Engineering Geology Problems in Appalachia." R. R. Thompson is organizing a trip on "Environmental Geology in the Pittsburgh Area."

Intersociety Committee for Standardization of Particle-Size Ranges

Division representative A. V. Jopling reported it seems unlikely that any real measure of agreement on standardization can be reached.

A. V. Jopling was reappointed as the Division's representative.

GSA-ASCE Joint Committee on Engineering Geology

The Committee sponsored a half-day session on *Dynamic Problems in Engineering Geology* at the GSA Annual Meeting in Atlantic City on November 12, 1969. This excellent session was organized by G. A. Kiersch.

A half-day session on the *Geologic Aspects of Sub-surface Waste Disposal* is planned for the ASCE meeting in Phoenix, Arizona, on January 14, 1971. The program is as follows: Neilson Rudd, "A Deeper Look at Deep Well Disposal"; William C. McClain, "Underground Disposal of Radioactive Wastes"; H. K. van Poolen, "Rocky Mountain Arsenal Well and the Denver Earthquakes"; George M. Hughes and Keros Cartwright, "Sanitary Land-fill: Scientific and Engineering Criteria."

Engineering Geology Division representatives are Harry F. Ferguson and Paul L. Hilpman.

Program Representative for 1971 Annual Meeting

S. C. Sargent (3925 Chesterbrook Road, Arlington, Virginia 22207, Phone : 202-386-5684) was appointed as Program Representative for the 1971 GSA Annual Meeting scheduled for November 1-3, 1971, in Washington, D. C.

Nominating Committee

This Committee is to select nominees for Chairman, Chairman-Elect, Secretary-Treasurer, and Management Board Representative. The following appointments were made: H. G. Hershey, Chairman; W. H. Stuart; D. H. MacDonald.

Technical Committees

The Chairman reappointed the Technical Committee Chairmen, with the exception of the Construction Materials Committee, for which E. M. Winkler was appointed because of the resignation of B. Erlin.

SPE Geological Engineering and Geohydrology Committee

J. C. Manning was reappointed as the Division's representative on this Committee.

Section Liaison Representatives

The following Section Liaison Representatives were reappointed for 1971.

Liaison Representatives

R. C. Richter
E. T. Cleaves

Section

Cordilleran Section, GSA
Northeastern Section, GSA

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J. M. Kellberg	Southeastern Section, GSA
R. E. Barnett	North-Central Section, GSA
D. T. Snow	Rocky Mountain Section, GSA
C. Golder	South-Central Section, GSA

Chairmen of Technical Committees

The following Committee Chairmen were reappointed:

C. J. Monahan.....	Dams and Reservoirs
D. S. Carder.....	Engineering Seismology
C. R. Kolb.....	River Engineering
A. L. O'Neill.....	Underground Excavation

COMING EVENTS

October 19-22, 1971, Association of ENGINEERING GEOLOGISTS, Annual Meeting, to be held at the Hilton Hotel, Portland, Oregon. Write: R. K. Dodds, or J. L. Holland, Co-Chairmen, P. O. Box 8708, Portland, Oregon 97208.

13th Symposium on Rock Mechanics

Theme: Stability of Rock Slopes,
August 30, 31, and September 1, 1971

University of Illinois
Urbana, Illinois

Sessions include: (1) Exploration and determination of shear strength properties, (2) Methods of stability analysis, (3) Design of slopes, (4) Performance of slopes, and (5) General topics in rock mechanics.

Papers on these topics are requested to be submitted for review before June 1, 1971, to A. J. Hendron, 2230 C. E. Building, University of Illinois, Urbana, Illinois 61801.

TWENTIETH ANNUAL HIGHWAY GEOLOGY
SYMPOSIUM PROCEEDINGS AVAILABLE

The *Proceedings of the Twentieth Annual Highway Geology Symposium*, held at the University of Illinois at Urbana-Champaign April 17-19, 1969, is available. The symposium was sponsored by the University of Illinois Departments of Civil Engineering and Geology, the Illinois Division of Highways, and the Illinois State Geological Survey.

Topics included in the *Proceedings* are: "Soils of Illinois and Their Engineering Characteristics"; "A Geotechnology Profile in Jo Daviess County, Illinois"; "Problems with Highway Cuts in Loess Near East St. Louis, Illinois"; "Fracture Surfaces of Carbonate Aggregates: A Scanning Electron Microscope Study"; "Foundation Exploration for Interstate 280 Bridge over Mississippi River Near Rock Island, Illinois"; "Seismic Mapping of Cavities and Voids"; and "Properties of Lime-Treated Soils."

Copies of the *Proceedings* are available for \$3.00 per copy from the Engineering Publications Office, 112 Engineering Hall, Urbana, Illinois 61801.

Chairman, Howard A. Coombs, b. Dallas, Texas, April 10, 06; m. 36; c. 1. GEOLOGY. B.S., Washington (Seattle), 29, M.S., 31, Ph.D. (geol), 34. With Mt. Rainier Nat. Park, 30-33; instr. GEOL, WASHINGTON (SEATTLE), 34-38, asst. prof., 38-42, prof., 42-52, HEAD DEPT, 52- Consult. geologist, State Dept. Hwys. Wash., 35-; U. S. Army, 34, 36, 37; Crown-Zellerbach Paper Corp, 36-; Wash. Bridge Authority, 39; Austin & Co. & U. S. Navy, Wash. & Oregon, 40-41; Seims-Drake, Puget Sound Co. & U. S. Navy, 42; Henry J. Kaiser, 42; City of Seattle, 43-; City of Tacoma, 46-; Japan, 50; Stone & Webster Eng. Corp, 56-; R. W. Beck & Assoc, 57-; Fel. Geol. Soc. Amer.; Seismol. Soc.; Soc. Econ. Paleont. & Mineral. Petrology of igneous rocks; engineering geology, especially to dam sites. Address: Department of Geology, University of Washington, Seattle, Washington 98105. (From: *American Men of Science*)

Chairman-Elect, Richard E. Gray, is a Civil Engineering graduate of Carnegie-Mellon University and a Vice President of General Analytics, Inc., Consulting Engineers, Monroeville, Pennsylvania. He is Chairman of the Joint Committee on Engineering Geology of The Geological Society of America and the American Society of Civil Engineers, a member of the American Society for Testing and Materials Committee D-18 on Soil and Rock for Engineering Purposes, and Secretary of the Engineering Geology Division of The Geological Society of America. Mr. Gray is a Registered Professional Geologist and Certified Engineering Geologist in California.

Secretary-Treasurer, Norman A. Dixon, graduated from the University of Washington with a B.S. Degree in Geology; employed in various Corps of Engineers Districts and private municipalities throughout the United States as an engineering geologist and civil engineer, 1949-64; District Geologist for Alaska District, Corps of Engineers, Anchorage, 1964-66; and Staff Geologist at Office of the Chief of Engineers, Washington, D. C., 1966-Present.

NINTH ANNUAL ENGINEERING SYMPOSIUM
PLANNED FOR APRIL 5-7 IN BOISE, IDAHO

The Idaho Department of Highways will host the Ninth Annual Symposium on Engineering Geology and Soils Engineering April 5, 6, and 7, 1971, at the Downtowner Motel, Boise, Idaho, with L. F. Erickson, P. E., as Committee Chairman.

Papers in the discipline of engineering geology, foundation studies, hydrogeology, soil and rock mechanics and allied subjects are invited. Two technical sessions (half day each) for the presentation of papers of primary interest to industry having a direct applicability to the fields of engineering geology and soils engineering are planned. These sessions are to be devoted to new developments in how to obtain information, new techniques, new equipment, etc. They are not intended for sales promotion. Abstracts of all papers are requested by the Committee for review prior to acceptance for the convention.

Further details, with preregistration information, can be obtained by writing R. G. Charboneau, Coordinating Secretary, Annual Symposium, P. O. Box 7129, Boise, Idaho 83707.

THE ENGINEERING GEOLOGIST
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Divisional Officers--1971

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Seattle, Washington 98105

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Secretary-Treasurer.....Norman A. Dixon,
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Gerald J. Wasserburg

CALIFORNIAN RECEIVES
ARTHUR L. DAY MEDAL

At its 1970 Annual Meetings in Milwaukee, The Geological Society of America presented the Arthur L. Day Medal to Gerald J. Wasserburg, of the California Institute of Technology, Pasadena, California, for his outstanding contributions through the applications of physics and chemistry to geologic problems.

Dr. Wasserburg was born in New Brunswick, New Jersey, in 1927. He received both his Master's and Doctoral degrees from the University of Chicago and has contributed formally and informally to a wide range of topics in the earth sciences.

Dr. Wasserburg helped to develop potassium-argon dating techniques, which are used to date sequences of layered rocks in the exploration for oil, gas, and metals. He has also participated in the lunar sample evaluation program, and his studies of the geology of radioactive elements have led to contributions in the areas of heat flow in the earth, the chemical composi-

tion of natural gases, and the evolution of the earth's atmosphere.

Dr. Wasserburg is a Fellow of the American Geophysical Union, a member of the American Academy of Arts and Sciences and The Geological Society of America.

SUMMER INSTITUTE ON PHYSICOCHEMICAL
SOIL BEHAVIOR TO BE HELD FOR COLLEGE TEACHERS

The University of Arizona has received a grant from the National Science Foundation in support of a Summer Institute for College Teachers of Civil Engineering, Geological Engineering, Engineering Geology, and Soil Science to be held June 28 through August 6, 1971. The six-week institute will integrate soil engineering concepts with physicochemical behavior mechanisms to present a unified view of soil behavior. The twenty-four participants will be selected from colleges and universities in the United States and Canada.

Address inquiries to Professor Richard L. Sloane, Department of Civil Engineering and Engineering Mechanics, College of Engineering, The University of Arizona, Tucson, Arizona 85721.

NEWS OF THE PROFESSION

Three members of The Geological Society of America recently accepted appointments as advisors to the Joint Committee on Seismic Safety of the California Legislature.

George Gates has had an impressive career with the U. S. Geological Survey. From 1941 to 1960, he was with the Alaska Branch, where he rose to Chief of Branch. After the Alaskan earthquake of 1964, he was assigned to direct the detailed investigations conducted by the Geological Survey. Until his retirement in 1970, Mr. Gates served as Assistant Chief Geologist at the Survey's Pacific Coast Headquarters in Menlo Park, California. He is presently a member of the Advisory Committee and Engineering Criteria Review Board of the San Francisco Bay Conservation and Development Commission. Mr. Gates received his Bachelor's Degree from the University of California, Berkeley, and did graduate study at Stanford University.

Richard H. Jahns is Dean of Stanford University's School of Earth Sciences and has been a Consulting Geologist for the New Mexico Bureau of Mines and Mineral Resources since 1950. Affiliated with several professional organizations, Dean Jahns has had extensive geological experience in the east, the south, and the west and is the author or co-author of several well-known monographs and major reports.

Donald R. Nichols, Geologist with the U. S. Geological Survey, Menlo Park, has accepted an appointment as Vice-Chairman of the Committee's Advisory Group on Land Use Planning. With the Survey since 1951, Mr. Nichols is currently Chief of the Survey's San Francisco Bay Sediment Engineering Geology Project. He is also currently participating in a joint USGS-HUD study of environmental factors relating to regional planning. He has authored more than forty scientific and official reports in his field and is an active member in seven scientific societies.

All three are serving as members of the Joint Committee's Advisory Group on Engineering Considerations and Earthquake Sciences.



Ralph A. Bagnold

**RALPH A. BAGNOLD RECEIVES
1970 PENROSE MEDAL**

The Geological Society of America presented its top award, the Penrose Medal, to Ralph A. Bagnold of Edenbridge, Kent, England, at its Annual Awards Dinner at the 1970 Annual Meetings in Milwaukee. The gold medal is awarded annually by the Society for eminent research in pure geology.

Dr. Bagnold, born in 1896 in Devonport, England, is the 41st recipient of the Penrose Medal. Following military service in World War I, Dr. Bagnold was awarded an engineering degree with honors at Cambridge University. Later, he rejoined the army to serve in Egypt, India, and China.

While abroad, he explored the desert as a hobby, using self-contained, light cars to travel great distances across country to study sand dunes and their formation. In 1935, Dr. Bagnold retired from the army to pursue his interests in the physics of sand dune formation. He was recalled to the army in 1939, and was located in Egypt, where, in 1940, he created and commanded the Long Range Desert Group. The Group operated independently over the formerly inaccessible interior of northeast Africa for purposes of reconnaissance, piracy, and general harassment of the enemy's exposed desert flank.

After his release from the Army, he expanded his research to include the physics of water-transported sediments on sea beds and rivers. His sediment transport studies are used today by geologists and engineers studying flood control, bank erosion and levee construction, harbor and beach erosion problems, and airborne particulate matter pollution problems.

He is a member of the Royal Society, Royal Geographical Society, and The Geological Society of America. He was awarded the Founder's Gold Medal by the Royal Geographical Society in 1933 for exploration of the Libyan Desert. In 1969, he was awarded the G. K. Warren Prize by the National Academy of Sciences for the theoretical work in sediment transport physics.

At present, he is working toward a theoretical solution of the amount of sediments streams can carry.

**NOMINATIONS FOR E. B. BURWELL, JR.,
MEMORIAL AWARD**

The E. B. Burwell, Jr., Memorial Award of the Engineering Geology Division is made to the author or authors of a published paper of distinction which advances knowledge concerning principles or practice of engineering geology or of the related fields of applied soil or rock mechanics where the role of geology is emphasized. Although the paper shall have been published not more than five years prior to its selection, there is no restriction as to the publisher or publishing agency. The author or authors of the selected paper need not be a member or members of the Engineering Geology Division or of The Geological Society of America and need not be residents or citizens of the United States. A certificate and cash award will be presented to the recipient at the annual Engineering Geology Division luncheon.

The recipient of the award is selected by a six-member committee appointed by the Management Board of the Division.

**PROCEEDINGS OF THE FIRST CONFERENCE ON
SOIL MECHANICS AND FOUNDATION ENGINEERING
NOW AVAILABLE**

The *Proceedings of the First Conference on Soil Mechanics and Foundation Engineering*, held at Harvard University in June 1936, will be reprinted, provided that 100 orders are received in advance. The anticipated total price is \$40.00 (U.S.) for the three volumes (in full size and bound with hard covers), including postage. It is hoped that the reprinting can be completed by March 1971, or sooner.

Orders should be placed by writing to Dr. Steve J. Poulos, Geotechnical Engineers, Inc., 934 Main Street, Winchester, Massachusetts 01890, U.S.A.

**NEW BOOKS AND LITERATURE
IN ENGINEERING GEOLOGY**

Richard H. Howe

Proceedings, Fifth Forum on Geology of Industrial Minerals, Karl V. Hoover, editor: Bulletin M 64, Pennsylvania Geologic Survey, 1969 (Available from Bureau of Publications, Tenth & Market Streets, Harrisburg, Penna. 17125), \$2.35 plus .15 sales tax for Penna. residents; checks should be made payable to Commonwealth of Pennsylvania.

There are seven papers in the session on "The Geology of Sand and Gravel Deposits," seven in "Can Industrial Mineral Production Survive Urbanization and Conservation," and six panel members contributed to a brief Symposium on "Industrial Mineral, Land Use, and Conservation Problems."

The papers briefly summarized below seem to have the most general application to engineering geology problems.

"Detailed Petrography--An Aid in the Evaluation of Gravel Aggregate for Freeze-Thaw Resistance," by Nanna B. Stewart.

Molded concrete cylinders were subjected to repeated freeze-thaw cycles in the Power's slow-cool procedure. The lithologies which produced cylinder dilations exceeding the critical level were identified.

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The highly deleterious rock types were chert, fine-grained low-rank graywacke, and fine-grained quartzite.

This paper contains much detailed information, and it is refreshing to find the author pointing out her misidentifications made during the brief preliminary, hand specimen inspection. May this caution the reader and this reporter when next tempted to make a hasty identification.

"The Role of Applied Geology in Producing High Friction Aggregate," by William E. Cutliff.

New specifications up-grade the skid resistance of New York State Highways by placing additional limitations on the aggregate acceptable for use in bituminous concrete. Apparently the seriousness of the problem of slippery pavements overshadowed the consequences of any adjustments in the "competitive structure of the stone industry" of New York State. Specifications incorporated the results of comparisons between roadway coefficients of friction and petrographic analyses of aggregates. Producers are required to submit a geologic report outlining areas of high friction aggregate and to mark the quarry faces. Although in most cases, selective quarrying produced aggregate meeting the new requirements, 27 percent of the quarries did not have an economic quarriable interval that would yield high friction aggregate.

This paper contains a good, brief background to the problem of pavement slipperiness related to aggregate characteristics, a summary of the specifications, and better discussion of the significant aggregate properties than is to be found elsewhere.

"Mineral Resources, Computers, and the Environmental Context," by James R. Dunn and William A. Wallace.

Input for the computer model includes data on the geology of the region, proposed transportation systems, mineral extraction, and demographic characteristics, as well as development and plans. Each of the 1,200 square miles was inventoried for quantity and quality of the stone, and sand and gravel resources. The economic impact of new specifications, new concepts of raw material use, new construction techniques, and new transportation modes can all be determined quickly, and alternate plans can be analyzed with this simulation technique. Some of the assumptions and problems involved in developing the input data, as well as some of the applications of the output, are discussed.

This stimulating paper should lead to widespread application of this systematic method. Despite any limitations on the validity of the output due to the generalizations required by the input, it is a great advance over older, intuitive methods.

22nd Canadian Soil Mechanics Conference

The following papers were among those presented at the 22nd Canadian Soil Mechanics Conference.

"Black Shale Heaving at Ottawa, Canada," by R. M. Quigley and R. W. Vogan: *Canadian Geotechnical Journal* 7(2): 106-115 (May, 1970) including Discussions by J. Berard and N. R. Morgenstern.

Three inches of differential heave over a 20-year period has caused severe structural deformation of a lightly loaded building founded directly on drained black shale of the Ordovician Lorraine Formation. The exterior, loadbearing walls, founded on shale below the water, do not appear to have moved.

Long-term oxidation of iron sulfides to produce hydrous sulfates of much greater volume is believed to

have caused the movements. Oxidizing bacteria have probably catalyzed the reactions that have occurred in a plug of drained rock, which is kept warm by a circumferential heating tunnel. This shale plug supports the interior columns. The discussions include suggestions for remedial measures and examples of similar reactions in ore beneficiation and concrete disintegration, as well as other examples of shale swelling related to the formation of gypsum.

"The Engineering Significance of Pleistocene Stratigraphy in the Saskatoon Area, Saskatchewan, Canada," by A. B. MacDonald and E. Karl Sauer: *Canadian Geotechnical Journal* 7(2): 116-126 (May, 1970).

It was found that it is practical for the field engineer to identify and interpret drift stratigraphy in the field; also, that the engineering soil properties were significantly different between different stratigraphic units. The importance of drift stratigraphy in locating gravel deposits, artesian aquifers, and boulder pavements was shown to be critical in areas where they were masked by surficial sediments and, therefore, unrelated landforms.

"Regional Geology and Landslides in the Marine Clay Deposits of Eastern Canada," by P. LaRoche and J. Y. Chagnon: *Canadian Geotechnical Journal* 7(2) 145-156 (May, 1970).

There was found to be a coincidence between the concentration of landslides and the existence of buried valleys. These sand-filled valleys permit artesian pressures to develop near the toe of the slopes. Gradients close to that critical for the "boiling" of sands have been found. Also, the downward percolation of surface water near the tops of the slopes could promote leaching of the clay with a resulting decrease in undrained shear strength and an increase in sensitivity.

In one of the three areas of landslide concentration studies (Desbiens), there is a remarkable similarity in the pattern of the contours on the bedrock surface and the contours of undrained shear strength and sensitivity in the upper part of the overlying clay, more than 120 feet above the bedrock.

"Riverbank Stability Study at the University of Alberta, Edmonton," by S. Thomson, with Discussions by N. L. Iverson and E. W. Brooker: *Canadian Geotechnical Journal* 7(2) 157-172.

Upper Cretaceous shales and sandstones are overlain by preglacial sands and gravels and then till and glacial lake sediments. A large, buried preglacial valley at one side of the study area enhanced slope stability by lowering the piezometric surface. Seepages from a coal seam, however, contribute to small slides in the lower part of the river bank.

Iverson emphasized the author's recognition of the following: the importance of analyzing the local geology before studying the soil mechanics; the importance of determining effective strength; and the effect of varying pore pressures or piezometric levels on the factor of safety.

Brooker points out the importance of installing slope indicators and piezometers before construction begins, and the importance of continuing measurements during and after construction. He also warns that the placement of under drains can precipitate slope failure unless operation is carried out very carefully.

Canadian Geotechnical Journal

For the information of any readers of this newsletter who are not acquainted with the *Canadian Geotechnical Journal*:

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New Books and Literature...
(continued from page 6)

"...publishes papers, in English or French, covering the general field of soil engineering together with papers in the related disciplines of Geology, Soil Science, and Snow and Ice Mechanics as they relate to civil engineering."

The *Journal* is published quarterly. Personal subscriptions, \$5.00 per year; multi-user subscriptions, \$10.00 per year; single numbers of current volumes are \$3.00 each.

Subscriptions, requests for single numbers, and all remittances should be sent to Administration, National Research Council of Canada, Ottawa 7, Canada.

Remittances should be made payable to the Receiver General of Canada, credit National Research Council of Canada.

A subscriber for some years, this reporter recommends the *Canadian Geotechnical Journal* to soils engineers especially as a BEST BUY.

Governor's Conference on Geological Hazards, Utah

Condensations of papers presented at the Governor's Conference on Geological Hazards in Utah in 1967 are the concern of Special Studies 32 of the same name released today by Utah Geological and Mineralogical Survey. Landslide, earthquake, construction and cloudburst hazards are authoritatively investigated and illustrated in the 21-page study. Available at the UGMS office on the University of Utah campus, Special Studies 32 sells for \$1.50.

IMPORTANT

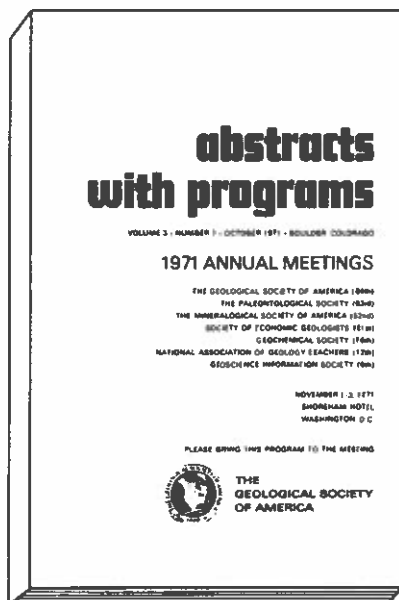
There will be no general mailing of Circulars 1 and 2 this year because a new method of announcing the meeting will be tried. Circular 1 will appear as a one-page announcement in the May issue of *Geotimes*, and Circular 2 will appear as a four-page insert in the September issue of *Geotimes*. PLEASE look for these announcements in the May and September issues of *Geotimes* for information on the 1971 Annual Meeting in Washington, D. C., November 1-3, 1971.

The **Abstracts with Programs Series** is now available on a subscription basis beginning with Volume 3 for 1971.

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