



THE  
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# Quaternary Geologist and Geomorphologist

NEWSLETTER OF THE QUATERNARY GEOLOGY AND GEOMORPHOLOGY DIVISION OF THE GEOLOGICAL SOCIETY OF AMERICA

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## CURRENT RESEARCH ACTIVITIES

Bob Black, University of Connecticut, will return to the Aleutian Islands again this summer for an interdisciplinary study of the Aleut ecosystem, including a complete tour of Umnak Island, to work with geographical changes of the ash stratigraphy, the relation of alpine and ice cap glaciation, the timing of ice-free corridors, the relation of beaches to the glacial chronology and ash stratigraphy, and so forth. This is an attempt to define the chronology of events and work out the specific environment of the ancient Aleuts as an outgrowth of earlier studies, part of which are published or in press.

J. T. Andrews, University of Colorado, summarizes the following activities: In east Baffin Island a large scale interdisciplinary program in the fields of Quaternary geology, geophysics, climatology, micro-meteorology, and glaciology was carried out with the support of the National Science Foundation, Grant #GA-10992, and the U.S. Army Research Office, Durham, Grant #DA-ARO-D-31-124-G1163. A total of 16 people participated, including Andrews, R. G. Barry, and 11 graduate students. Theses are being prepared by D. Pheasant on Quaternary chronology and isostatic uplift; G. Miller on late and Neoglaciation of the mountain ice caps and corrie glaciers; P. Carrara on the chronology of events in one valley; L. Williams on a theoretical study of the relationship between incoming solar radiation and glacier mass budgets and cirque development; and J. Jacobs on the radiation regime of the region. The program in this region of Baffin has now been under way for three years and it is hoped that publications on the region will soon be ready for submission. Last year, budget and energy studies were continued on the Arapahoe Glacier and D. Alford extended the study to include the mass budgets of 14 glaciers for the 1969-1970 season. B. Fahey is nearing completion on a Ph.D. thesis involving instrumentation of freeze-thaw activities at five sites between 7,500 and 12,300 feet. The field work was carried out over two years and involved direct measurements of ground movements by the so-called "bedsteads." In October, 1970, the Institute of Arctic and Alpine Research received a contract from the Bureau of Reclamation to study the effects of cloud seeding on the environment and ecology of the San Juan alpine area. At the same time we were requested to produce a map of geomorphic features that might respond to enhanced snowfall, plus a generalized cover type map. P. Carrara and A. Meir are presently involved in the air photo interpretation. As part of the project we will be undertaking a broad regional investigation plus detailed local

studies on the numerous rock glaciers that are so characteristic of this region. Part of the program calls for a complete inventory of all rock glaciers, and this will ultimately involve a statistical analysis to try to explain their over all distribution. It is hoped that we will be able to treat the rock glaciers in the same way as normal glaciers in terms of computations of mass and energy budgets. A month will be spent on the coast of British Columbia, between Ocean Falls and Bella Bella, in connection with an archaeological project with the University of Colorado. Particular attention will be focused on the relationship between the archaeological sites and relative sea-level changes. Some time will also be spent in the San Juan Mountains attempting to establish a lichen curve for dating the various types of deposits, with a view to attempting to distinguish between deposits that occurred randomly in respect to time and those that are related to broad climatic changes. Finally, a considerable amount of time will be devoted to pulling together the results from the Baffin Island program and 12 people will be working in the area again this coming summer. A short paperback book for Wadsworth Publishing Company entitled *Glacial Systems: An Approach to Glacial Geology* is also under way.

C. C. Reeves, Texas Technological University, has been mapping Quaternary sands of eastern New Mexico for Geologic Atlas Project, Bureau of Economic Geology, Austin, Texas. Results show three main units: pre-Illinoian sand; the early Illinoian "cover sands;" and the later Illinoian Loveland Loess. Also continuing is the related study of Quaternary caliche development. Anyone knowing of caliche localities (of any age) in northern U.S. or Canada is asked to please advise. Mapping of southern High Plains on Apollo orbital photos is also under way. They illustrate amazing correlation between geology and soil development.

Studies of Tertiary-Quaternary lacustrine deposits of Big Bend region, Texas, are under way and regional studies of pluvial lake basins, particularly in West Texas, eastern New Mexico, and Chihuahua, Mexico, are continuing.

Victor Baker, University of Colorado, is finishing up a doctoral dissertation entitled "Paleohydrology and Sedimentology of Lake Missoula Flooding in Eastern Washington", the purpose of which was to make a quantitative reconstruction of flood hydraulics from the available field evidence. Maximum water surface profiles from various scabland channels were used to estimate discharges and flow of velocities. Various hydraulic parameters were related to maximum sizes of boulders moved during the Pleistocene flooding. Of particular interest was the hydraulic interpretation of giant current ripples.

Paul Karrow, University of Waterloo, Department of Earth Sciences, studied raised marine terraces near San Diego, California, while on sabbatical leave at Scripps from January to June, 1970. July and August, 1970, were spent in stratigraphic studies in southern Saskatchewan for the Geological Survey of Canada. He plans 1971 as a writing year, with no new field projects. Joint projects now under way with Owen L. White, Department of Civil Engineering, are the urban geology of Kitchener-Waterloo, Ontario, and Spencer's Laurentian valley north of Toronto.

Thane Anderson, University of Waterloo, Biology Department, has just completed his Ph.D. thesis on the palynology of bogs, small lakes, and Lake Algonquin sediments in southwestern Ontario. This study, supervised by Paul Karrow, has yielded much new information on the vegetative history following ice retreat and, supported by a number of C<sup>14</sup> dates, has provided a chronology for late Lake Algonquin.

B. A. Sreenivasa, supervised by H. R. N. Eydt, University of Waterloo, Biology Department, is near completion of the study of pollen midges and cladocera in cores from a kettle lake in the nearby Waterloo moraine.

Dr. Ann Morgan, a postdoctoral fellow in the University of Waterloo Department of Earth Sciences, is studying the fossil beetles of the Port Talbot organic beds and the Scarborough Formation at Toronto. The latter is famous for its supposedly extinct beetle faunas, but recent opinion indicates most, if not all, will be found extant.

Don Coates, State University of New York at Binghamton, has just finished a note to be published in the GSA *Bulletin* providing new information on the Valley Heads substage and Holocene flood plains in southern New York. Another paper will appear in the proceedings volume of the Symposium on Environmental Geomorphology. The results of the recent questionnaire sent to 150 university geomorphologists concerning activities in environmental geomorphology are being tabulated. For the coming year he will be on sabbatical leave in New York, except for one month in Switzerland and Scotland. For the coming summer, investigations on the comparison of terrain and hydrogeology of the Appalachian Plateau will continue under a Research Foundation Fellowship. He will continue as editor of the New York Glaciogram.

Richard Madole, Adrian College, has just finished a short paper, "Neoglacial Facies in the Colorado Front Range," and is in the midst of another on the "Pre-Pinedale Stratigraphy of Lower St. Vrain Drainage Basin, Boulder County, Colorado." Plans for the summer include completing work on the Ward Quadrangle, Colorado, with Delores J. Gable of the U.S.G.S., to be published in the GQ Map Series; and commencing work on a project recently funded whose abridged title reads Stratigraphic, Palynologic, and Radiocarbon Correlation of Stades of Pinedale Glaciation in Boulder County, Colorado. As recipient of an NSF Science Faculty Fellowship, he will be on leave at the University of Colorado for one year beginning September, 1971, working on applications of statistics and computer science to various geomorphic problems.

Ray E. Wilcox and Virginia Steen McIntyre, U.S. Geological Survey, Denver, are compiling references for the first edition of the INQUA World Bibliography on Quaternary Tephrochronology (volcanic ash chronology). Total range of subject matter to be covered in the bibliography has not yet been set but may include discussions of source areas, petrography, chemistry, etc., of volcanic ejecta in deposits of Pleistocene and Holocene age. Other suggested categories are age-dating, archaeology, geomorphology, palynology, soils, weathering, and vegetation as specifically related to the ejecta in these deposits. A separate section will deal with methods of collecting, preparing, examining, and "fingerprinting" samples of pyroclastic material for use in tephrochronology. Compilation is to be completed by December, 1971. Because relevant articles are so widely dispersed in the scientific literature, they invite people who have pertinent reference titles in their files for work done in North America, Central America, and adjacent oceanic areas that might be overlooked in a general search of geologic literature to send them to the above address before November 1 for selection and editing.

Jane Forsyth, Bowling Green University, visited the southern hemisphere on a winter sabbatical, touring East Africa and then New Zealand, where Pat Suggate, Max Gage and Jane Soons provided a preview of moraine and outwash sequences and active fault scarps to be included in some of the INQUA trips in 1973. She is

continuing her studies on postglacial pre-Maumee Lakes in west-central Ohio and is readying for publication a description of a buried Bull Lake soil in the northern Colorado Rockies. Next year she will initiate a new course in environmental geology.

#### KIRK BRYAN AWARD

Winner of the 1971 Kirk Bryan Award for the outstanding paper in geomorphology is Professor Lincoln Washburn, University of Washington. The award for "a published paper of distinction advancing the science of geomorphology" was given by the Division Panel for two combined works: *Instrumental observations of mass-wasting in the Mesters Vig district, northeast Greenland*, Medd. Grønland, bd. 166, nr. 4, 1967, and *Weathering, frost action, and patterned ground in the Mesters Vig district, northeast Greenland*, Medd. Grønland, bd. 176, nr. 4, 1969.

Together these papers constitute a significant effort in quantitative geomorphology bearing upon the understanding of Arctic surficial processes. Since both papers stem from the same research, they are logically considered a single contribution. Much of the present knowledge of Arctic environments is based upon qualitative analyses. Thus, Washburn's extensive quantitative measurements are major steps toward providing precise data required for thorough understanding of the nature of present and past Arctic periglacial environments. Geomorphologists will find this quantitative approach exceedingly valuable both with regard to research in periglacial phenomena and in application to studies of other geomorphic processes.

Presentation of the award will be at the Division's Luncheon and Business Meeting during the GSA Annual Meetings in Washington, D. C., November 1-3, 1971.

#### HOOVER MACKIN FUND AND AWARD ESTABLISHED

Upon the recommendation of the Division's Management Board, the GSA Council has established the Hoover Mackin Memorial Fund and Award. The Hoover Mackin Award will consist of a stipend made available annually through the Quaternary Geology and Geomorphology Division to provide financial support for research in geomorphology or Quaternary geology. The amount of the stipend will depend on the amount of income derived from the Hoover Mackin Memorial Fund. Details are still to be worked out, but the award will be administered by the Committee on Research Grants in consultation with the Division's Management Board.

Because of Professor Mackin's close rapport with students during his career, the award is intended for graduate student research, but may be made to non-students in exceptional cases. The recipient of the award will be selected on the basis of the best proposal submitted by January 10 of each year. Funds will be made available to the recipient by June 1 and the award will be announced at the Business Meeting of the Division at the Annual Meetings of the Geological Society. The award need not be made if insufficient funds are available or if no appropriate proposal has been submitted, in which case interest for the fund may be accumulated or added to the principal.

Applicants for the award will submit an outline of their proposed project which shall deal with some aspect of research in geomorphology or Quaternary

geology, either basic or applied. In addition, the applicant will provide a biographical sketch and if the applicant is a student who proposes to include the results of the research in a thesis, the applicant will furnish a supporting statement from the thesis advisor, together with statements from two other faculty members who are familiar with both the proposal and the applicant. The annual deadline for submission of proposals to the Secretary of the Division will be January 10. Because the fund will be too new to have generated significant income, no award is contemplated for 1972.

Contributions to the Hoover Mackin Memorial Fund may be sent to GSA Headquarters, P.O. Box 1719, Colorado Building, Boulder, Colorado 80302.

## PUBLICATIONS

Listed below are some publications of possible interest to Division members. It should be emphasized that this list is not in any way comprehensive and is not a list of nominees for the Kirk Bryan Award. An attempt has been made to include some references to guidebooks and papers published in journals other than the standard ones. Members who know of such papers are encouraged to send them to the editor for inclusion in future lists.

- 1971, White, S. E., Rock glacier studies in the Colorado Front Range, 1961 to 1968: Arctic and Alpine Research, v. 3, no. 1, p. 43-64.
- 1969, Stewart, D. P., and MacClintock, P., The surficial geology and Pleistocene history of Vermont: Geol. Survey Vermont Bull., no. 31, 251 p.
- 1970, Reid, J. R., Jr., Geomorphology and glacial geology of the Martin River Glacier, Alaska: Arctic Inst. North America Jour., v. 23, no. 4, p. 254-267.
- 1969 Nichols, R. L., Geomorphology of Inglefield Land, North Greenland: Medd. Grønland, bd. 188, nr. 1, 109 p.
- 1970, Mörner, N., The position of the ocean level during the interstadial at about 30,000 B.P.--A discussion from a climatic-glaciologic point of view: Canadian Jour. Earth Sci., 8, 132, p. 132-143.
- 1970, Mörner, N., Eustatic changes during the last 20,000 years and a method of separating the isostatic and eustatic factors in an uplifted area: Palaeogeography, Paleoclimatology, Palaeoecology, v. 9, p. 153-181.
- 1970, Richmond, G. M., Comparison of the Quaternary stratigraphy of the Alps and Rocky Mountains: Quaternary Research, v. 1, no. 1, p. 3-28.
- 1969, Richmond, G. M., Development and stagnation of the last Pleistocene icecap in the Yellowstone Lake Basin, Yellowstone National Park, U.S.A.: U.S. Geol. Survey, v. 20, p. 196-203.
- 1970, Péwé, T. L., and Updike, R. G., Guidebook to the geology of the San Francisco Peaks, Arizona: Museum Northern Arizona Plateau, v. 43, no. 2, 102 p.
- 1969, Warnke, D. A., Pediment Evolution in the Halloran Hills, Central Mojave Desert, California: Zeitschr. Geomorphologie, N.F. bd. 13, heft 4, p. 357-389.

- 1968, Hails, J. R., and Hoyt, J. H., Barrier development on submerged coasts: Problems of sea-level changes from a study of the Atlantic Coastal Plain of Georgia, U.S.A. and parts of the East Australian Coast: Zeitschr. Geomorphologie, bd. 7, p. 24-55.
- 1969, Lasca, N. P., The surficial geology of Skeldal, Mesters Vig, Northeast Greenland: Medd. Grønland, bd. 176, nr. 3, 56 p.
- 1970, Krinsley, D. B., A Geomorphological and Paleoclimatological study of the Playas of Iran - Part I: Geological Survey, 329 p.
- 1970, Krinsley, D. B., A Geomorphological and Paleoclimatological study of the Playas of Iran - Part II: Geological Survey, p. 330-486.
- 1970, Washburn, A. L., An approach to a genetic classification of patterned ground: Acta Geographica Lodziensia, nr. 24, p. 437-446.
- 1970, Washburn, A. L., Instrumental observations of mass-wasting in an arctic climate: Zeitschr. Geomorphologie, bd. 9, p. 102-118.
- 1969, Short papers on Quaternary research in Canada (17 short papers illustrating Quaternary activities of the Geol. Survey of Canada): VIII INQUA Congress, Paris.

SOIL SCIENCE SOCIETY OF AMERICA  
AND AMERICAN SOCIETY OF AGRONOMY  
PLAN AUGUST FIELD TRIP

The Soil Science Society of America and the American Society of Agronomy have designed their post-New York meeting tours on August 21-22 for the New Haven salt marshes and Harvard forest to attract geomorphologists near New England. Walter Lyford will lead the group and will show stream birth and erosion in microwatershed development. Write Professor Richard W. Arnold at Cornell University, Ithaca, New York 14850 for further information. Registration at New York is not essential.

Don J. Easterbrook  
Secretary