

## The Geological Society of America

### Geomorphology Newsletter 8

April 1964

Contributions for this Newsletter were scarce this year. Sent in by the faithful few, they total a little more than three pages (plus more than 4 pages of other material). Compare this with the April 1962 issue (#6) of more than 12 pages of News Items plus more than 6 pages of other, and the June 1963 issue (#7) of 11 pages plus 5 other. This year we tried to go easy on the Associate Editors and contacted you along with the annual Geomorphology Notices sent out from the GSA Office to everyone in the Geomorphology Division in January 1964. This obviously was not very successful.

We have not abandoned the technique of using Associate Editors in various sections of the country, although the burden on some may be heavy. We do, however, like to pass the work around, and we now welcome volunteers for next year's gathering of the News. An Associate Editor does not have to reside nor even work in the section which he canvasses, just as long as he believes he can stir up his friends there either vocally or by letter to send in (1) information on research programs (past, present, future); (2) items calling attention to recent publications, or in foreign literature, or translations; (3) news of meetings, symposia, field conferences; and (4) news about his activities. Here is a list of the sections (and approximate number of Geomorphology Division people involved) for which we would be happy to have volunteers: Eastern Canada, 12; Western Canada, 10; New England States and New York, 50; Central East Coast (Del., Md., N.J., Penn., Va., Wash, D.C., W.Va.), 50; South East Coast (Ala., Ark., Fla., La., Miss., No. Carol., So. Carol., Tenn.), 20; Great Plains (Iowa, Kan., Mo., Neb., So. Dak., No. Dak., Okla., Texas, Mexico), 50; Rocky Mountain area (Colo., Wyo., Ida., Mont., New Mex.), 40; California, 40; West Coast, Hawaii, Alaska (excl. Calif.), 30. We will want people in the North Central States, and try to contact those living in foreign countries. If you already serve as Associate Editor and would care to continue, or if you volunteered several years ago and wish to again, please drop us a line and let us know; please write anyway to Department of Geology, Ohio State University, 125 South Oval Drive, Columbus, Ohio 43210. First to write, first to serve!

We still receive a number of kind letters from kindred souls who have just read a Newsletter picked up off of your desk and who wish to receive one of their own and want to be placed on the "distribution list" for future copies. Would you please kindly explain that all that is necessary is to be either a Member or Fellow of GSA, be interested in geomorphology, and be able to write to the GSA Office stating the wish to be affiliated with the Geomorphology Division. Then the letter "G" will be placed opposite his name on his Address Plate and he will receive next year's Newsletter.

Now what do you want to see reported in the Newsletter? We are wondering! Here are more suggestions; please write and let us know what you think of them: in addition to News Items on research projects in geomorphology, news about the work of others in allied fields of research? Announcements of Field Conferences (time value here; we try to publish in May of each year)? Tips on how to finance your field work (Ha!)? Abstracts of research not likely to see the light of publication otherwise? Notices of popular books in other areas of interest? reviews of geomorphologically-oriented books? Reviews of our future editions accordingly.

Please send in your own News Items. Mark them for the Newsletter. How about setting yourself a deadline of next February 15?

Sidney E. White, Editor

Notes from the Secretary's Desk

Officers for the Year 1964 are:

Chairman, A.L. Washburn

First Vice-Chairman, W.C. Bradley

Second Vice-Chairman, G.W. Holmes

Secretary, L.H. Nobles

New Panel members elected to serve two-year terms starting June 1, 1964, are S. A. Schumm, A. N. Strahler, and S. E. White.

W. C. Bradley resigned from the Panel effective December 14, 1963, to accept a nomination as First Vice-Chairman of the Division. In accordance with the by-laws, he was replaced on the Panel by J.H. Mackin. The other two holdover Panel members are D. R. Crandell and D. F. Eschman.

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KIRK BRYAN AWARD FOR 1964.

The Kirk Bryan Award for 1964 will go to Robert F. Sharp for his paper Wind ripples: Jour. Geol. Vol. 71, p. 617-636, 1963.

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Citation of Arthur H. Lachenbruch for the Kirk Bryan Award, November 19, 1963

The Geological Society of America through its Council takes pleasure in naming Arthur H. Lachenbruch as recipient of the Kirk Bryan Award for distinguished contribution to geomorphology and related fields.

The paper cited is one entitled "Mechanics of thermal contraction cracks and ice-wedge polygons in permafrost", which appeared as G.S.A. Special Paper No. 70 in 1962. As it has in making this award on past occasions, the Society recognizes a sustained and continuing contribution to the science on the part of Dr. Lachenbruch, in that this paper is only one of several contributions that he has made through which geophysical concepts are brought to bear on matters of geomorphic significance.

In this work, the recipient has helped in the interpretation of the mechanics of ice and ground cracking which affect the development of microrelief features. He has related surface and subsurface temperature regimes to the development of frost cracks, and thus has contributed to the scope of inference about past conditions from present field evidence. Especially significant are new possibilities opened by his work for the recognition of climatic and physiographic changes using as evidence precise geothermal gradients.

It is particularly fitting that the Kirk Bryan Award be made for work which uses the methods of related fields of science to make significant contributions to geomorphology. It was a characteristic of Kirk Bryan himself to encourage such interdisciplinary investigations, and the award named for him is a way of recognizing and encouraging not only geomorphology but associated fields as well.

## NEWS ITEMS

Ansel M. Gooding, Earlham Coll. (Richmond, Ind.), is continuing his Pleistocene studies in Southeast Indiana and adjacent areas. Detailed mapping of glacial geomorphology, stratigraphic studies, studies of pollen and mollusks in interstadial and postglacial sediments, studies of pollen and weathering phenomena of buried interglacial soils, and petrology and fabric of tills are the areas of investigation.

Don J. Easterbrook, Western Washington State Coll. (Bellingham, Wash.), had the results of his Pleistocene research in northern Puget Lowland (obtained under an NSF grant) published in December 1963 (GSA Bull.). Work on the use of void ratios and bulk densities in identification of glacial till will be published. Field work on glaciomarine drifts in northwest Washington will continue Summer 1964.

Robert F. Black, Univ. Wisconsin (Madison), reports a most hectic year with field work in the Aleutians and the Antarctic interspersed with trips to England and South Africa. The work in the Aleutians regarding late Pleistocene history and Man is now completed. The Antarctic studies in patterned ground will be mothballed while the sand wedges and ice wedges grow undisturbed, to be studied years hence for long term growth rates. Field work in Summer 1964 in Wisconsin should wind up some of the problems in connection with glaciations of the Driftless Area and those of the Pleistocene of Wisconsin.

Stanley A. Schumm, USGS (Denver), will leave in July 1964 for one year in Australia; he will be based at Dept. Geography, Univ. Sydney, to study modern and ancient rivers of the riverine plains area in New South Wales. The project is USGS sponsored and a Water Resources Division cooperation during the forthcoming International Hydrologic Decade.

R. L. Langenheim, Univ. Illinois (Urbana), has a graduate student, Peter Ealey, engaged in study of a series of linear cracks or joints in caliche in Clark County, Nevada. This particular locality offers an excellent opportunity to determine whether these particular joints result from compaction of underlying sediments or from crustal deformation. These workers would appreciate knowing of others engaged in similar investigations.

The note in Geomorphology Newsletter #7 about helping to keep alive Arid Regions Research Newsletter brought a fine contribution for A.R.R.N. from Rodman E. Sneed, Clark Univ. (Worcester, Mass.) Did anyone else help out too? Incidentally, Sneed's study of the coastal desert morphology of the Las Bela Valley, West Pakistan, is soon to be published by Louisiana State University Press.

Gerald G. Parker, USGS (Denver), with summer geologic field assistants Peter W. Sparks, Robin A. Parker, and William M. Reidy began studies of slope development, cliff recession, stream profiles and cross-sections and other similar and related geomorphic studies in cooperation with personnel of the National Park Service at Bryce Canyon National Park and Capitol Reef National Monument. Similar studies will be started in Summer 1964 at other national parks in the drylands of the West.

Bjørn G. Andersen, Univ. Oslo, and G. William Holmes (Bldg 24, A.R.C., Beltsville, MD.), continued to work on the Fennoscandian moraine system in Norway and Sweden. They made a reconnaissance in western Norway and tentatively agreed that the Fennoscandian moraine of Younger Dryas age is probably below the sea or on outlying islands. Moraines purported to be the Fennoscandian were too small and too far inland. They also made detailed study of the type Ra moraine, including morainal stratigraphy in the Oslofjord district, and obtained five shell collections for dating purposes.

Arthur D. Howard, Stanford Univ., was appointed departmental chairman on 1 Sept 1963. He is not apologizing for the lack of recent publications yet.

Marie Morisawa, Antioch Coll. (Yellow Springs, Ohio), is continuing Summer 1964 her research financed by Environmental Research Branch, Army Research Center, first on quantitative measurements on scree slopes (size of materials, angle and depth of scree, distribution) in the Mosquito Range and Collegiate section of Sawatch Range, Colorado, and then later make motion studies of the same scree slopes.

Sidney E. White visited Univ. Stockholm's Research Station at Kebnekaise, Sweden, Summer 1963, and then studied techniques and results of mass movement studies in Karkevagge, northern Sweden, and in Padjelante, an area southeast of Sarek Mtns. In Swedish Lapland for six weeks with Anders Rapp, Per Jobs, and Kjell Gustafson. He will continue Summer 1964 his motion studies of three rock glaciers started in 1961 on the east side of Colorado Front Range (Boulder District), and put into effect techniques learned from Rapp, on talus, pro-talus ramparts, rock glaciers, and solifluction slopes to determine extent of debris supplement to cirque floors and upper valleys.

Coastal Studies Institute activities include a six-month study of low-tidal flat, beach, and eustatic studies in Australia, Cocos-Keeling, Mauritius, Seychelles, and South Africa by Richard J. Russell Louisiana State Univ. (Baton Rouge), W. G. McIntire, H. V. Howe, and J. Sauer; continuing investigation of beach morphology on the Outer Banks of North Carolina by R. Dolan, N. Meland, and others; continuing investigation of Gulf Coast peat deposits and minor sedimentary structures by J. M. Coleman, S. M. Gagliano, W. G. Smith, and others; continuing coastal field work in Brazil and Uruguay by J. P. Morgan, and P. J. V. Delaney; continuing investigations in the Colville Delta area, Alaska, by H. J. Walker, L. Arnborg, and J. Peippo. In June 1964 a party will leave for seven months investigations of deltas in Queensland and Malaya. In early Autumn 1964 another party will leave for the West Indies, where emphasis will be placed on reef and reef flat investigations. N. B. Psuty and B. Thom have included coastal investigations in Tabasco, and Thom will be working along the Atlantic coastal plain Spring and Summer 1964. Increasing numbers of reports are being issued as University Studies by Louisiana State University Press.

Bruce C. Heezen and Marie Tharp, Lamont Geological Observatory (Columbia Univ., N.Y.), have been working for more than 18 months on a physiographic diagram of the Indian Ocean. It includes the area from 20°E to 127°E and from 30°N to the coast of Antarctica, and will be published soon. It incorporates much of the data obtained so far by the International Indian Ocean Expedition, including cruises of Lamont's ships VEMA and ROBERT D CONRAD. Submarine physiographic studies of the Congo Submarine Canyon and of the equatorial Atlantic Fracture Zones are completed and submitted for publication. Interaction between deep-sea currents above the ocean floor is currently under investigation, particularly in regard to the Mediterranean undercurrent west of Gibraltar. Several of Heezen's students are studying physiography and sediments of various areas in the world: Nicolas Munoz, the Columbia Abyssal Plain; Charles Hollister, the Labrador Sea; Eric Schneider, the Caicos Cone; William Ryan, the Sohn Abyssal Plain and Tyrrhenian Sea; Jessie Heitner, the Continental Shelf off New Jersey; James Hays, submarine geological and paleontological investigations related to the Antarctic Polar Front. A bathymetric chart of the North Atlantic Ocean is under preparation for the American Geographical Society's Atlas of the Marine Environment, as well as a similar chart for the American Geographic Antarctic Atlas.

John R. Reid, Univ. North Dakota (Grand Forks), together with graduate students Samuel Tuthill, Ted Callender, and undergraduates Frank Schulte and Bruce Switzer, completed the second year of NSF-sponsored research on the Martin River Glacier, Alaska, Summer 1963. Wilson M. Laird was in the field with the party during the first two weeks. In addition to mapping glacial geology and collecting tree cores for dendrochronological and climatological analyses, much research was completed in the disciplines of limnology, sedimentology, and plant ecology. The tree core data are to be programmed in the near future.

The Geological Survey of Canada annually publishes a summary of field work, and 16 items on glacial geology and reconnaissance studies of geomorphology all over Canada by our many friends in the G.S.C. was called to our attention (G.S.C. Summary of Activities: Field, 1963, Paper 64-I, 1964, 35 cents).

Stephen C. Porter, Univ. Washington (Seattle), studied Summer 1963 the glacial geology of the Chagvan Bay region of southwest Alaska and identified there four episodes of glaciation, the youngest of which is classical Wisconsin and the oldest possibly pre-Illinoian. He also spent a month in the Marshall Islands as a member of an AEC expedition to Pingelap Atoll to study recent geology of the atoll islands and to investigate effects of nuclear explosions on this atoll. During Summer 1964 he will continue work on glacial history and chronology of the central Washington Cascades along the valley of Yakima River where there appears to be a very complete record of late Pleistocene glacier fluctuations. It should be possible to bracket closely the ages of late- and post-Wisconsin moraines using volcanic ash units (sic) from Cascade volcanoes.

Aleksis Dreimanis, Univ. Western Ontario (London), assisted by three students, mapped Pleistocene deposits south of London for Ontario Dept. Mines - more stagnant ice landscapes were noted than known before and the Lowest Maumee stage was found to be contemporaneous with formation of the St. Thomas moraine. Test drillings in Early Wisconsin deposits below the Lake Erie level were continued in the Port Talbot area. G. D. McKenzie is studying the Port Talbot samples, and U. Vagners continuing his investigations of the relationship of lithologic and granulometric composition of till to bedrock. M. Risk is studying development of ripple marks along the east shore Lake Huron, and D. Buckley has completed his M.Sc. thesis on Recent Marine Sediments of Lancaster Sound.

David M. Hopkins, Alaskan Geol. Branch, USGS (Menlo Park, Calif.), will work in Iceland Summer 1964 with R. A. Doell, paleomagnetist (USGS), and Thorleifur Einarsson, Pleistocene geologist of Univ. Research Inst. of Iceland. The study will be part of a joint Icelandic-American investigation of possible correlations of Pleistocene deposits and events in Iceland and Alaska, using stratigraphic, paleontologic, paleomagnetic, and radiometric techniques. Many coastal areas in Iceland will be visited, but work will be concentrated chiefly in the area of Tjornes and Snaefellsnes. This is to be followed in 1965 by joint studies by Einarsson and Hopkins in the Pribilof Islands, Alaska. Hopkins' research during the last several years was concerned chiefly with biostratigraphic studies in Tertiary nonmarine rocks and late Tertiary-Quaternary marine rocks in Alaska. Investigations conducted with Jack Wolfe and Estelle Leopold (USGS) have resulted in a subdivision of late Tertiary rocks in Alaska into three stages based upon their fossil plants; one of the results has been the recognition of the processes by which a temperate forest evolved into the present taiga and tundra vegetation in Alaska. A Professional Paper describing these studies is in progress. Investigations conducted with David McCulloch in the marine Pliocene-Pleistocene sequence of Alaska have resulted in the recognition of at least six marine transgressions that can be separated under favorable circumstances on the basis of associated faunas, stratigraphic relations, and relationships to the paleomagnetic sequence: A paper describing these marine events is in press; another written jointly with R. Merklin and R. M. Petrov of USSR Academy of Sciences and with MacNeil (USGS) proposing tentative late Cenozoic marine correlations between western Alaska and Chukotka is in preparation.

The Institute of Polar Studies at Ohio State Univ. had a number of projects of geomorphological interest in 1963. Early in the year, John Mercer and Fred Anliot went to Argentina to work out a very interesting sequence of late-post-glacial fluctuations. Along with limnological, meteorological, and bedrock studies at Lake Tasersiaq, Greenland, Kaye Everett studied movement of lower slopes and soil profiles, while George Crowl and Richard Goldthwait tried to solve the problem of Wisconsin deglaciation and recent minor glacier advances east of Sukkertoppen Ice Cap. More is to be done in 1964. Also during Summer 1963, Harold Borns (and later Goldthwait) worked out the post-Wisconsin history of the Kaskawulsh

Glacier, Yukon Territory, and the production of some modern deposits. Meanwhile in Glacier Bay, Alaska, George Haselton and Fred Larsen studied the production of glacial till ridges and drumlins there and started to add to our knowledge of the Little Ice Age stratigraphy. Haselton will return here summer 1964. In Antarctica (Nov. 1963-Feb. 1964), besides usual bedrock geology and lichen studies, Richard Cameron set up long-term glaciological studies near Byrd Station, and Goldthwait studied past glacial history and quantitative weathering processes in Queen Maude Mtns under very cold interior conditions.

Chauncey D. Holmes, Univ. Missouri (Columbia) assumes a new title, Professor Emeritus, on 1 Sept. 1964. He plans to reside permanently in Tully, N.Y., and to continue study on late-glacial/post-glacial history of central New York using palynology and radiocarbon dating.

Arthur T. Fernald is on temporary leave (Jan.-May 1964) from USGS as Visiting Lecturer with the Department of Geology, University of Michigan.

Paul MacClintock, Princeton Univ., enjoys release from active teaching by working summers for Vermont Geological Survey on the Pleistocene history of the state. He affirms that "superimposed different till sheets show several different episodes of glaciations."

#### Announcements

##### Review Volume on Quaternary

A review volume on the Quaternary of the United States will be published for the 1965 INQUA Congress, with H. E. Wright and D. G. Frey as Editors. Chapters on the geology of the glaciated area east of the Rocky Mountains will be prepared, with the assistance of co-authors in most cases, by R. W. Lemke, H. E. Wright, J. C. Frye, W. T. Wayne, R. P. Goldthwait, E. H. Muller, and J. H. Hartshorn; of the unglaciated eastern and central United States by H. G. Richards, H. A. Bernard, E. C. Reed, and J. C. Frye; of the western United States by G. M. Richmond, G. R. Scott, H. E. Malde, R. B. Morrison, F. E. Kettlowski, D. R. Crandell, and T. L. Pewe. In addition, 8 chapters have been organized on phytogeography, 9 on zoogeography, and 5 on archeology. Finally, a series of miscellaneous subjects will be treated separately, as follows: continental shelves, J. R. Curray; isotope and geochemistry, W. G. Broecker; paleopedology, R. V. Ruhe; chemical paleolimnology, F. M. Swain; paleohydrology, S. A. Schumm; glaciology, M. F. Meier; vulcanology, R. E. Wilcox; paleomagnetism, Allan Cox; neotectonics, P. B. King; dendrochronology, H. C. Fritts; and theoretical paleoclimatology, J. M. Mitchell. The reviews are intended to report recent and current research in the areas or subjects concerned. The authors listed above will welcome, just as soon as possible, notice of very recent or imminent publications that otherwise might be unknown to them.

##### Seminar on Glaciology and Geomorphology of Northern Baffin Island

The Geological Survey of Canada, Geographical Branch held a seminar on the glaciology and geomorphology of northern Baffin Island, 28 Feb. 1964; these papers were to be presented:

The glacierization and deglaciation of Baffin Island: A general statement, J. D. Ives

The palynology and macrofossils of the Isotoq River plant-bearing beds, radiocarbon dated at 30,000 yrs.BP to younger than 24,600 yrs.BP, J. Terasmae

The pattern of land uplift and isostatic readjustment on the west coast of Baffin Island, J. T. Andrews

The recent history of the northern and western margins of the Barnes Ice Cap, J. T. Andrews

The technique of lichenometry and its reliability in northern Baffin Island, P. J. Webber  
The regime of the Barnes Ice Cap, 1962 and 1963, R. B. Sagar  
Glacier recession in the Bruce Mountains, D. A. Marrison  
Preliminary studies on the hydrology of the Lewis Glacier river, M. Church  
Till fabric studies in the cross-valley moraines of the middle Isotoq valley, B. B. Smithson  
Geomorphological mapping and studies in northwestern Baffin Island (Milne Inlet and Tay  
Sound), G. Falconer

1963 GSA Guidebook for Coastal Connecticut Still Available

Copies of 1963 GSA Guidebook for Field Trip No. 5, Postglacial stratigraphy and morphology of coastal Connecticut, by Arthur L. Bloom and Charles W. Ellis, Jr. are \$1.00 each from Dept. Geology, Cornell Univ., Ithaca, N.Y. This is not a road log but rather a descriptive and analytical study of postglacial geologic development of the Connecticut coast accomplished in 21 pages and with 10 figures.

INQUA Congress, Boulder, Colorado August – September, 1965

If you have not already received the Second Circular with Registration Papers enclosed for the VII INQUA Congress meeting in Boulder, Colorado, August 30 – September 5, 1965, then write quickly to

Gerald M. Richmond, Secretary General  
VII INQUA Congress  
Building 25, Denver Federal Center  
Denver, Colorado

So much information about this Congress was reported to you in the last Newsletter (#7) that not much need be added here. Read all about it in the Second Circular: Interest in some of the proposed field trips already is overwhelming, and some trips have been doubled in capacity: Gerry Richmond writes about problems with which he still needs help:

We could really use some help in raising funds – even a few hundred here and there would help. Will anyone willing to help please contact me (Gerry).

We urge that as many institutions as possible plan on a lecture series or part of a lecture tour by INQUA foreign participants. These would have to come early – as soon as school opens after the Congress. Please contact E. S. Deevey for lists of names, subject matter, and qualifications to speak in English.

We urge consideration of longer term engagements particularly through the NSF Senior Foreign Scientist Fellowship Program. Each of 80 institutions participating in this NSF program may nominate one man for themselves; 1965 is the year to select someone from the biological or earth sciences who is also hoping to be able to come to INQUA. Selection of the individuals is up to the institution and is competitive within that institution among all science departments. Fellowship requirements from NSF or me (Gerry).

We urge all prospective authors who are planning to give papers at the Congress and who wish to publish through sources available to INQUA to get their papers to us by September 1, 1964. We urge, above all, not to put everything off until the last minute. It takes a very long time to arrange lecture tours with people abroad, to arrange financing, and to get papers edited and published. We need your help and can help you. NOW.

Information about the one-day INQUA Field Excursions to be offered on a free day during the middle of the meetings at Boulder was sent to us. Here is a brief list, just of the titles of the proposed trips, with leaders and co-leaders added:

1. Arapaho Glacier and associated cirque features, H. A. Waldrop and S. E. White
2. Ecology on Mt. Evans, W. A. Weber
3. Ecology of the alpine tundra on Trail Ridge, B. E. Willard
4. Forest ecology in the Front Range, J. W. Marr
5. Frost phenomena, patterned ground, and ecology on Niwot Ridge, W. S. Osburn, J. B. Benedict, and A. E. Corte
6. Glacial geology and periglacial features in Rocky Mtn. National Park, G. M. Richmond
7. Limnology and palynology of some alpine and plains lakes, R. W. Pennak
8. Economic geography of the Front Range and Colorado Piedmont, D. D. MacPhail
9. Stratigraphy, soils, and geomorphology of the non-glacial Quaternary between Boulder and Golden, H. E. Malde and R. Van Horn
10. Stratigraphy, soils, and geomorphology of the non-glacial Quaternary southwest of Denver, G. R. Scott
11. Influence of climate on soils and vegetation in the Denver area, R.F. Hadley and F.A. Branson

Volume I of the QUATERNARY section of The Geologic Systems, General Editor: Kalervo Rankama, is expected from John Wiley & Sons (605 3<sup>rd</sup> Ave., N.Y.) in July 1964, tentative price \$8.95, educational discount 10%. Contents of Vol. I: The Quaternary of Sweden, by Jan Lundqvist; The Quaternary of Finland, by J. J. Donner; The Quaternary of Denmark, by Sigurd Hansen; The Quaternary of Norway, by Bjorn G. Andersen.

#### RECENT PUBLICATIONS AND REVIEWS

Geology, by William C. Putnam, Oxford University Press (417 5th Ave., N.Y.) 496 pp., 1964 \$8.00 -a beautifully written and illustrated text of physical geology. Putnam's treatment proceeds "... from the materials, such as minerals and rocks, which make up the visible Earth, through their geometric arrangement within the crust, to the various processes responsible for shaping the landscape, and ... conclude(s) with a panorama of the development of life." Not only does the order of subject matter depart from the ordinary but it made sense to anyone who had lived and taught geology for so many years in a country so torn with geological stress and tension. Manner and scope of coverage within each chapter also has a fine flavor of its own - fresh, clear, and often sparkling in most, but, coming from a geomorphologist, oddly confused and lacking in breadth in a few. Anent this, the text for a few of the 119 figures and 190 photographs are wanting in accuracy or in interpretation. And fortunately, anyone interested in finding the old classical viewpoint of stream and landscape development had better turn elsewhere. The photographs used border on brilliance so striking are they. They reflect not only the remarkable ability of the many contributors to depict geology at its best (outstanding here are the oblique aerial views of John S. Shelton), but also the initial collection of photographs by the author and the final selection by his colleagues.

No account of Lester C. King's The Morphology of the Earth: A study and synthesis of world scenery can do justice to such a monumental work as his in the brief space given here. No review of this tome is attempted, but it is appropriate at least to give recognition of its existence. King sets himself the goal of matching the geomorphology of continents across ocean basins. So comprehensive is his story and so worldwide is its scope that one wonders that he could do it even in the 680 pages (notwithstanding



those he eliminated), with 250 figures including many maps and 12 photographs, published by Oliver and Boyd Ltd, Tweeddale Court, Edinburgh, Scotland, 1962 84s (\$11.76) Only a list of contents is offered but this may permit one to decide whether to indulge himself, get a copy, and set aside a month or two for its reading or not: The Basis of Scenery - the Behavior of the Earth's Crust, its structure, Gondwanaland, shields, mobile welts; The Development of Continental Scenery - Degradation and Aggradation, standard cycle of denudation, depositional landforms, tectonics and landscape evolution, ages of landsurfaces; The Scenery of the Plainlands, geomorphology of Africa, remainder of Gondwanaland, North America, Europe, Asia; The Scenery of the Mountainlands, Palaeozoic mountain chains, Mesozoic mountains, Cainozoic mountains, modern ranges; Review - Towards a Model of the Earth. One of the most thought provoking ideas is the comparison between continents shown on the geomorphologic maps (cyclic denudational land surfaces) of Africa and eastern Brazil. This work is written with the same uninhibited enthusiasm, intellectual keenness, and intensity as his lectures are given. The matter of continental drift is considered accomplished fact and he proceeds from there. This of course has made questionable the value of the book for some, but it is preferred here to await judgment until after that long hoped-for month or two for reading arrives.

An attempt at mechanically weathering six different rocks (slate, black mica schist, granite, porphyritic granite, quartzite, gneiss) is in A preliminary study of experimental frost weathering, by Sten Wiman; appears in *Geografiska Annaler*, Vol.XIV, 2-3, p. 113-121, 1963. Some of each kind of rock were kept dry, others with only wetted surfaces, and others rested half in water. All underwent two ranges of freezing and thawing - 36 cycles varying between -7°C. and +6°C., and 9 cycles varying between -30°C. and +15°C. Only a slight loss due to spalling or flaking of particles occurred, in most cases less than 1%, but a few were more than 1% of the original rock by weight. The dry rocks were not affected at all. Those undergoing the 36 cycles spalled the most and the particles spalled were much the larger by far.

Have you examined Fluvial Processes in Geomorphology by Lune B. Leopold, M. Gordon Wolman, and John P. Miller yet? It appeared in April 1964 and contains a great deal more basic or fundamental geomorphology than the title implies. You may buy it from W. H. Freeman and Co. (660 Market St. San Francisco, Calif.) for \$10.00 for which you will receive 507 text pages including 60 figures, 48 photographs, and 48 tables; then relax and enjoy it. The authors jointly give their greatest attention of course to river processes but there is plenty more to it than that. This is a just-off-the-press notice; your Editor has read into the book only a short way, but here is a list of contents: after introductory chapters on the evolving landscape, Process and Form – Climate and Denudational Processes, Weathering, Drainage Basin, as a Geomorphic Unit, Water and Sediment in Channels, Channel Form and Process, Hillslope Characteristics and Processes; The Effects of Time – Geochronology, Drainage Pattern Evolution, Channel Changes with Time, Evolution of Hillslopes. Their objective in writing such a serious book is to pull together information so as to point out areas of research in geomorphology yet to be studied. They do not attempt to cover wind erosion and deposition, shoreline processes and coastal morphology, nor glaciology and glacial processes and landforms. Instead they investigate thoroughly one broad area in geomorphology and do an excellent job of it.

Friends of the Editor will say he just doesn't keep up with the literature when the book on Geomorphology by B.W. Sparks (Lecturer in Geography in University of Cambridge) is called to their attention. Published in 1960 by Longmans, Green & Co. Ltd, distributed in U.S.A. by John Wiley & Sons, the 371 pages with 201 figures and 51 photographs sells for \$6.75. Although the book needs careful reading and analysis by your reviewer, the matter of geomorphology seems to have been systematically and stolidly followed from the setting of the scene with a traditional account of the Davisian geographical cycle on through weathering, development of slopes, streams and fluvial erosion, drainage systems and landscape features under various bedrock conditions, and on to coastal processes and

morphology, effects of base level changes and of climatic changes, desert and savanna landforms, landforms in glaciated highlands and glaciated lowlands and associated features, and finally back to Davis with erosion surfaces and their interpretation. Naturally the whole text is slanted toward the British viewpoint with illustrative material drawn freely from the British scene and that part of the world. There is a healthy attempt to examine critically almost all of the old concepts and ideas so famous in geomorphology; this is good. Many of the sketches show a naivete concerning geological-geomorphological phenomena that is amazing to this reviewer. It is true that oversimplification often helps the student in the process of learning but not to the point of inaccuracy and misconception. The book is aimed at providing a rather complete coverage for British students taking Part I of the Geography Examinations at Cambridge. This it undoubtedly does, but one shudders to ponder the rude awakening for these students should they venture into the world of reality and criticism that most American geomorphologists face every day.

The Department of Geology, University of Alaska, in 1963 made available upon request and exchange 24 Reprint Series. The list of separates as well as the reprints may be obtained from: Secretary, College of Earth Sciences and Mineral Industry, Univ. Alaska, College, Alaska. Some of the more recent articles published in the less available periodicals are:

18. Mayo, L. and Pewe, T.L., 1963, Ablation and net total radiation, Gulkana Glacier, Alaska, in *Ice and Snow*: Mass. Inst. Technology Press, p. 633-643
19. Péwé, T.L. 1962b, Age of moraines in Victoria Land, Antarctica: *Journ. Glaciology*, vol. 4, no. 31, p. 93-100
20. ----- 1962c, Ice wedges in permafrost, lower Yukon River area near Galena, Alaska: *Biuletyn Periglacialny*, nr. 11, p. 65-76
21. ----- 1963a, University of Alaska Gulkana Glacier Project, 1962: *Arctic*, v. 16, p. 46
22. Forbes, R.B. 1963 Ultrabasic inclusion from the basalts of the Hut Point area, Ross Island, Antarctica: *Bull. Volcanologie*, tome 26, p. 13-21
23. Ragan, D.L. 1963 Emplacement of the Twin Sisters Dunite, Washington: *Amer. Jour. Sci.*, vol. 261, no. 6, p. 549-565

Number 11 of *Biuletyn Peryglacialny* for 1962 (p. 165-360) contains the papers of the Abisko Symposium of the XIX International Geographical Congress (July 28 -August 5, 1960) held at Abisko Turiststation in northern Sweden. This well illustrated collection, promised, edited, and just published by Jan Dylík, includes interesting stories and sidelights to the excursions not listed here; the titles of the complete papers are: *Geology and Morphology of the "Fjells"*, by Sten Rudberg; *Über Verlauf und Gesetzmässigkeit der Strukturbodengrenze*, by Jürgen Hóvermann; *Investigations on a Piedmont Drift Deposit in the Foot-hills of the Eastern Himalayas and its Glacial and Periglacial Significance*, by N. R. Kar; *Über die Glaziale und Periglaziale Problematik in der Tschechoslowakei*, by Jiri Ksandr; *Method of Deglaciation, Age of Submergence, and Rate of Uplift West and East of Hudson Bay, Canada*, by Hulbert A. Lee; *Glacial Erosion on Soft-rock Outcrops in Central Scotland*, by David L. Linton; *Die vom Grundrelief Bedingten Typen Glazialer Erosionlandschaften*, by Herbert Louis; *Ice-cored Moraines in the Kebnekaise Area*, by Gunnar Óstrom; *Observations Glaciologiques dans le Massif des Grandes Rousses (France)*, by Ch. P. Peguy; *Kärkevagge, Some Recordings of Mass-movements in the Northern Scandinavian Mountains*, by Anders Rapp; *A Report on some Field Observations concerning Periglacial Geomorphology and Mass Movement on Slopes in Sweden*, by Sten Rudberg; *Periglacial Frost Features and Related Phenomena in the United States*, by Harold T. U. Smith; *Morphological Evidence of Frost Action in Arctic Soils*, by John C. F. Tedrow; *Quantitative Investigations of Soil Movement in Frozen Ground Phenomena*, by Peter J. Williams.

Anders Rapp published an account as promised on "The debris slides at Ulvådal, western Norway An example of catastrophic slope processes in Scandinavia" (d. Akad. d. Wiss. in Gottingen II. Math. Physik. Klasse, Nr. 13, p. 196-210, 1963; one map, 2 sketches, and 7 photographs). Ulvådal is near the coast in south-central Norway; its stream leads into Romsdalfjord. Annual precipitation may be 1000 mm, and during heavy rains for two to three hours on the evening of June 26, 1960, 26 debris slides, narrow but 600 -1200 m long, moved down from the north side of the valley into Ulvådalsvatn and into the river below. Most of the valley side was denuded of vegetation, all soil, and its till cover. Both backward rotation and forward rolling occurred. As a later phase, water draining from the slide debris produced mudflows with typical levees and lobes up on the slide debris and out onto the valley floor. Slope wash, rill and gully erosion followed later that summer producing great alluvial fans. Slides had occurred once before on that slope. Rapp warns that we must be cautious in interpreting similar deposits elsewhere, ancient or recent, as indications of climatic change.

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#### RESEARCH ITEMS RECEIVED TOO LATE FOR NEWSLETTER # 7.

In Autumn 1962, Woods Hole Oceanographic Institute in cooperation with U. S. Geol. Survey initiated a five-year field and laboratory program to study the sediments, topography, structure and biology of the continental margin off the east coast of United States. K. C. Emery, formerly Professor of Geology at Univ. Southern Calif., is in charge of the project. John Schlee, in charge of USGS personnel at Woods Hole, and Don Casey, are studying the texture of the sediments. John Hathaway, Richard Tagg, and James Trumbull, all USGS, are investigating the mineralogy of the sediments. Jobst Hulsemann and John Watts from the Oceanographic Inst. are working on the organic composition of the sediments. Richard Pratt from the Institute is investigating the distribution and petrology of rocks cropping out on the shelf and slope, and E. Uchupi, also from the Institute, is working on topography of the continental margins. The structure of the shelf and slope is being investigated by Emery and Uchupi. Thomas Gibson, USGS, is working on foraminifera, and Roland Wigley and Arthur Merrill from the Bureau of Commercial Fisheries are studying the megafauna. The main objective is to assemble data from these various fields in order to understand more fully the geologic history of the continental margin. This should permit seaward extrapolation of geologic strata and structure and permit in return understanding of marine sedimentation responsible for strata now on the land.

Rudolf Martin (of Rudolf Martin & Associates Ltd, Calgary, Alberta), a subsurface geologist interested in resolving paleogeomorphological problems, calls to our attention the work being accomplished by petroleum geologists in Alberta on buried landscapes and fossil relief forms such as buried reefs, and how valuable is a knowledge of modern landforms in paleogeomorphology. Martin and Frank G. Jamin reported at the Second Conference on the Athabaska Oil Sands, in Edmonton (30 Oct 1963) on "Paleogeomorphology of the buried Devonian Landscape, Athabaska Bituminous Sands area and adjacent parts of Alberta." By the way, Martin received the Medal of Merit of the Alberta Society of Petroleum Geologists for the year's best paper "Principles of Paleogeomorphology" in Oct 1961 issue of Canadian Oil & Gas (13 pp.).

Hallam Movius, Jr. is on leave of absence from Harvard University until Sept 1964. He is in on leave of absence from Harvard University until Sept 1964. He is in France continuing the direction of the Abri Pataud Excavations (address: Les Eyzies (Dordogne), France) with a staff of four assistants. The aim and scope of this project, underway since 1958, is to determine the relative geologic age, associated fauna, geographic distribution and typologic range of the flint, bone, antler, and ivory implements associated with the Perigordian and Aurignacian, the two oldest Upper Palaeolithic cultures in Western Europe, using modern archaeological, ecological, geological, paleontological and paleobotanical procedures. The older excavation and classificatory techniques produced little in the way of evidence of ideas concerning settlement pattern, or even an appreciation of the total typologic range of the several industrial assemblages, the prevailing environmental conditions at the time of the successive occupations, and the daily economy of these early hunting groups. The data recovered thus far have shed new light on each of these areas of knowledge, and indicate that the proposed research can be expected to result in a very much needed revision of our understanding of and concepts pertaining to the history of man and his culture between circa 35,000 and 18,000 B.C.

The ultimate contributions to knowledge involve the following:

Stratigraphic Sequence - the Aurignacian and Perigordian cultural traditions interstratify in an exceedingly complex but poorly understood fashion. Early excavations at the Abri Pataud have revealed a sequence of archaeological events that occurred during the first half of the upper Palaeolithic in Western Europe.

Excavation Techniques - New and more precise excavation techniques would require development in order to make possible the recognition of micro-stratigraphic units, i.e. to isolate the assemblages found in association with specific occupation "floors."

Classificatory Procedure - The existing classification is too broad and comprehensive to permit detailed description and comparison of the archaeological materials characteristic of a given phase or subphase of the Upper Palaeolithic cultures under discussion.

Ecological -Environmental Studies - Certain of the major issues on which this research project is primarily focused can only be understood as involving a series of events in both natural and cultural history. Since the highly specialized hunting-gathering cultures of the Upper Palaeolithic were closely adjusted to their successive environments, it is of primary importance to obtain as complete data as possible on contemporary natural conditions.

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