

## **Symposium on Quaternary Stratigraphy, York University, Toronto, Canada, May 23-25, 1975**

This conference was organized to review the Quaternary in selected areas of North America, and was held under the auspices of Atkinson College of York University. Nearly 200 Quaternary scientists from various institutions in North America attended, and 24 papers were presented in four sessions.

The first session, cochaired by B. D. Fahey (Guelph University, Guelph, Ontario) and T. N. V. Karlstrom (U.S. Geological Survey, Flagstaff, Ariz.), began with a review of the glacial chronology of the eastern Canadian arctic by J. T. Andrews (University of Colorado, Boulder, Colo.) and G. H. Miller (Carnegie Geophysical Laboratory, Washington, D.C.). They evaluated amino acid diagenesis as an age-dating method in glacial-marine stratigraphy. D. R. Grant (Geological Survey of Canada, Ottawa) followed with a description of late-Quaternary sequences in the Atlantic provinces of Canada stressing, in particular, the pattern of Wisconsinan glacial movements in New Brunswick, Prince Edward Island, Nova Scotia, Cape Breton Island, and Newfoundland. Quaternary stratigraphy in the central St. Lawrence Lowland, as discussed by N. R. Gadd (Geological Survey of Canada, Ottawa), involved an interpretation of relationships between main Wisconsinan events in the Lowland with glacial events of the same interval in the Appalachian areas of Quebec. J. Terasmae (Brock University, St. Catharines, Ontario), and A. Dreimanis (University of Western Ontario, London, Ontario) correlated ice marginal positions with proglacial lake levels, and discussed suites of radiocarbon dates obtained from nonglacial materials in the Great Lakes area. D. R. Coates (State University of New York, Binghamton,

N. Y.) discussed the surficial deposits associated with the Erie, Ontario, Champlain-Hudson, and New England lobes. He gave particular attention to the origin of the Olean till and Binghamton drift, the chronology on Long Island, the absence of well-established time-stratigraphy in New York and Pennsylvania, and the interpretation of multiple superposed till sheets. J. H. Hartshorn (University of Massachusetts, Amherst, Mass.) reviewed major problems of the Quaternary of New England, such as the provenance of texturally different upper and lower tills, the late-Quaternary isostatic adjustment, and deleveling history of glacial Lake Hitchcock, and the dilemma posed by inconsistent varve and radiocarbon chronologies. He urged the continuance of large-scale quadrangle mapping in order to determine relations between ice-marginal lakes, and drainage channels with complex associations of tills and stratified drift deposits (e.g., morphosequences of time-equivalent groups of landforms).

The second session, cochaired by D. R. Coates and D. R. Grant, began with a discussion of the Quaternary record in the Southern Appalachian Mountains by G. M. Clark (University of Tennessee, Knoxville, Tenn.), who summarized the problems of dating and correlating a complex of associated fluvial and mass wasting events. A presentation of the glacial geology of Wisconsin and upper Michigan, by R. F. Black (University of Connecticut, Storrs, Conn.), included the pre-Wisconsinan and Wisconsinan stratigraphy, as well as the complex problems associated with multiple advances and stillstands of Woodfordian ice and post-Twocreekan ice advances. H. E. Wright, Jr. (University of Minnesota, Minneapo-

lis, Minn.) reviewed the history of the Des Moines and Superior lobes, and discussed revegetation of moraines and outwash plains by tundra and forest species. H. C. Hobbs *et al.* (University of North Dakota, Grand Forks, ND) summarized the late-Quaternary lithostratigraphy and radiocarbon chronology of North Dakota, Manitoba, and Minnesota. R. P. Goldthwait (Ohio State University, Columbus, Ohio) discussed four interglacial-interstadial paleosols of Sangamon and Wisconsinan age found within the framework of dated tills. He also discussed the use of loess thickness, similarity of valley trains, proximity to end moraines, particle size, lithology, heavy minerals, clay minerals, and carbonate content for correlating discontinuous units. W. H. Johnson (University of Illinois, Urbana, Ill.) reviewed the glacial and eolian record in Illinois, the use of soils as stratigraphic markers, and the problems associated with the refinement and modification of the rock-stratigraphic classification. An important discussion relating to episodes of sedimentation and weathering during Wisconsinan time followed in an evening panel chaired by D. R. Coates, A. Dreimanis, and R. V. Ruhe (Indiana University, Bloomington, Ind.). Additional problems associated with dating the base of the Wisconsinan stage, practical application of stratigraphic research to land use planning, and the synchrony of late-Quaternary glacial-interglacial events were examined.

The third session, cochaired by V. K. Prest (Geological Survey of Canada, Ottawa) and S. E. White (Ohio State University, Columbus, Ohio), began with a discussion of midcontinent loesses by R. V. Ruhe. He focused on problems related to the age of the lower Wisconsinan loess, the time-transgressive nature of the soil-stratigraphic horizon separating the two major Wisconsinan loesses, and the upper loess. The eolian, fluvial,

and lacustrine record of the Southern Great Plains, and Woodfordian paleoclimate, were discussed by C. C. Reeves, Jr. (Texas Tech University, Lubbock, Tex.). He used vertebrate and invertebrate data, tephrochronology, and radiocarbon dates to correlate Quaternary deposits with the classical glacial sequence. The stratigraphic sequence in the Basin and Range, the Southern Rocky Mountains, and the Great Plains provinces of West Texas and New Mexico was discussed by J. W. Hawley *et al.* (New Mexico Bureau of Mines and Mineral Resources, Socorro, N.M.). He used radiometric, paleontologic, tephrochronologic, and pedologic evidence to establish subdivisions within the stratigraphic succession. T. N. V. Karlstrom established the late-Cenozoic time-stratigraphy of the Colorado Plateau from detailed records of local pluvial, fluvial, lacustrine, glacial, and pollen sequences. He also outlined the problems of continental correlation. P. W. Birkeland (University of Colorado, Boulder, Colo.) reviewed the glacial sequence in the Sierra Nevada, beginning with an examination of problems associated with the older diamictons, and K-Ar dates on pre-Wisconsinan deposits, and ending with a discussion pertaining to the use of relative age-dating criteria in separating Wisconsinan and Neoglacial deposits. W. C. Mahaney *et al.* (York University, Toronto, Canada) discussed the stratigraphy of the Colorado Front Range and evaluated the use of soils for differentiating late-Quaternary deposits.

The fourth session, cochaired by P. W. Birkeland and R. V. Ruhe, began with a summary of the Quaternary stratigraphy in the Wind River Range of Western Wyoming by G. M. Richmond (U.S. Geological Survey, Denver, Colo.), who discussed the major type localities for Rocky Mountain glacial deposits. Six episodes of glaciation in Yellowstone National Park, along with associated

lacustrine deposits and rhyolite tuffs and flows, enabled the development of a glacial-interglacial chronology. A. M. Stalker (Geological Survey of Canada, Ottawa) summarized the Quaternary stratigraphy of the southwestern Canadian Prairies using Blancan and Irvingtonian vertebrate fossils found in deposits of Nebraskan and Aftonian age. He also dealt with the relationship of the Pearlette type O ash to till sheets in the area, the Yarmouthian and Sangamonian vertebrate fauna, and four Wisconsinan tills separated by deposits of sand and gravel. Multiple glaciation in the Canadian Rocky Mountains was reviewed by N. W. Rutter (National Energy Board of Canada, Ottawa) who considered fluvial deposits of the last interglacial, and problems of correlating deposits across the Rocky Mountains. M. M. Miller (Michigan State University, East Lansing, Mich.) examined the evidence for three Wisconsinan tills, and for a pre-Wisconsinan glacier that left high-level, ice-scour features on nunataks in the central Juneau Icefield. D. J. Easterbrook (Western Washington State College, Bellingham, Wash.) summarized Pleistocene glaciations in the Pacific Northwest, and introduced evidence for magnetic reversals at approximately 36,000 yr BP. T. L. Péwé (Arizona State University, Tempe, Ariz.) reviewed the Quaternary stratigraphy of Alaska including major features of the glacial, fluvial, lacustrine, eolian, and marine record.

A second panel discussion, chaired by G. M. Richmond, A. M. Stalker, and N. W. Rutter, followed these last two sessions. They dealt with the age of Wisconsinan loesses and soils in the mid-western United States, problems of long-distance correlation, and the age of the earliest Wisconsinan deposits. On Sunday, May 25, J. Terasmae led a field trip to the Seminary section, Cathedral Bluffs, and Cudia Park areas of the Scarborough Bluffs which contain a nearly complete late-Quaternary sequence. These sections, along with abstracts of the various papers, are contained in *Quaternary Stratigraphy Symposium, Abstracts-with-Program*, 121 pp., and may be obtained at a price of \$3.00 from Quaternary Symposia, W. C. Mahaney, York University, Atkinson College, Department of Geography, 4700 Keele Street, Downsview, Toronto, Canada.

Symposium papers will be published as *The Quaternary Stratigraphy of North America* at a price of \$25.00. Copies of the proceedings will be available after January 1, 1976, and may be ordered from Dowden, Hutchinson and Ross Publishers, Box 699, Stroudsburg, Pennsylvania.

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