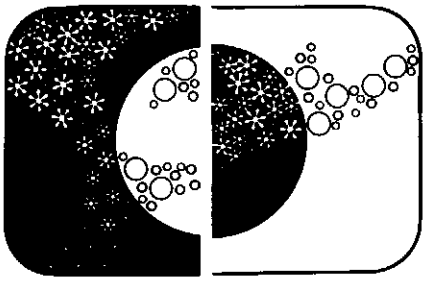

Quaternary Glaciations in the Northern Hemisphere

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The 1975 meeting of the Quaternary Glaciations in the Northern Hemisphere project (73/1/24) of the International Geological Correlation Programme, September 8-17, was hosted by United States with part of the field excursion taking place in Canada. Theme of the meeting was correlation of the last glaciation. About 40 people from 10 countries took part in the two days of symposium and eight days of field excursion. The technical session was held at Western Washington State College, Bellingham, Washington, four days of excursion were run in western and central Washington and four days in southcentral and southwestern British Columbia.

Technical Session

Twenty-seven papers, most of them dealing with some aspect of the stratigraphy of the past 150,000 years, were presented at the two-day technical session held in Bellingham. All will be prepared for publication in a proceedings volume. There was little controversy over the timing of the last main ice advance and general agreement that middle Wisconsinan time was a general non-glacial period in many glaciated areas. There was also general agreement that the time of commencement of the last glaciation would vary depending on the criteria used to define the change from nonglacial to glacial conditions. There was, however, obvious lack of agreement on whether the major ice advance that took place before the last Pleistocene advance was pre- or post-Sangamon in age. One of the more interesting and stimulating papers was given by J. Imbrie. He described the CLIMAP project, the changes that take place in ocean temperature and circulation during a glacial cycle and suggested that continental Quaternary records should be correlated with the records of adjacent marine areas before they are correlated with far distant land records.

Field Excursion

The first day of field excursion covered Whatcom County north of Bellingham and was led by D. Easterbrook. Glaciomarine sediments were the highlight of the day and there was much discussion concerning their origin and the nature of the material referred to by this name. Interpretation of the sediments seen called for a submergence of at least 350 feet, emergence of at least 300 feet, resubmergence of from 500 to 700 feet and re-emergence of 500-700 feet all in the space of 2000-2500 years. There was considerable discussion as to what might have caused this rapid fluctuation, of whether there was an alternative interpretation and whether such wide oscillations were possible.

D. Easterbrook led the excursion to Whidby Island on the second day of the field trip. Emphasis here was on deposits laid down prior to Fraser Glaciation (prior to 20,000 B.P.). The interpretation of these deposits was generally accepted but there was healthy disagreement on the interpretation of one particular diamicton unit as a till. This is a critical interpretation because the diamicton is part of the Possession Drift and has been used as a prime piece of evidence indicating that this area (and by implication southern and western British Columbia) were covered by an ice sheet at some time between 30,000 and 40,000 years ago.

During the third day the excursion crossed the Cascade Mountains to the Yakima Valley. S. Porter was leader. On the western side of the Cascades morphological features associated with the eastern margin of the Puget ice lobe were seen. A series of alpine moraines were crossed in and on the east side of the divide. An important point brought out in this area was the rapidity with which the alpine glaciers retreated. They were near their maxima 14,000 years ago and by 12,500 years ago most appear to have completely disappeared. There was considerable discussion over whether a paleosol occurring on one moraine was interglacial or interstadial and two complicated sequences of gravels, sands, and loęsses containing paleosols and tephra units were examined in the Yakima Valley.

D. Rahm and D. Easterbrook were leaders on the fourth day, during which the excursion saw features developed by the great floods of the Columbia River Plateau and features developed near the margin of the Okanagan Lobe. Most interpretations were based on regional relationships that could not be demonstrated at a single locality.

The fifth day was spent in the Columbia Mountain area of British Columbia, R. Fulton acting as leader. One major stop was made at the Meadow Creek site near Duncan Lake Dam. At this locality main discussion centred on the age and possible interpretation of a paleosol that was buried 41,800 years ago. There was general agreement that the soil formed during a middle Wisconsinan Interstadial but there was one strongly placed view that the soil developed during the last Interglacial.

R. Fulton was excursion leader the sixth day when the trip traversed the Interior Plateau of British Columbia. Main stop of the day was at the Riggins Road locality where discussion centred on a change in lithology from floodplain overbank sediments to lake silts that has been interpreted as marking the time (19,100 B.P.) when direct influence of Fraser Glaciation ice was first felt at the site. A series of three Middle Wisconsinan tephra units, which have been used to correlate widely separated sediments of this age, were seen in a single section at Kamloops. There was some discussion of the origin of the gravel, sand, rubble and diamicton in which the ash layers occurred, but most comments concerned the discontinuous nature of tephra beds.

J. E. Armstrong led the field trip through the Fraser Lowland the seventh day. Emphasis was on material laid down during retreat of Fraser Glaciation ice. The participants were impressed by

the wide diversity of deposits and appreciated the problem of attempting to make precise environmental interpretations of individual successions. Much discussion centred on the nature of the environment under which the materials referred to as glaciomarine might have been deposited.

On the last day of the excursion, Dr. Armstrong led the group to exposures of pre-Fraser Glaciation age deposits in the vicinity of the Coquitlam River. Most of the time was spent at the Mary Hill gravel pit examining a sequence of sediments reported to represent two glacial and two nonglacial periods. Most of the discussion revolved around the environmental interpretation of a sequence of organic sediments and their position(s) in the stratigraphic succession. A thick succession of Quaternary sediments was viewed in the Coquitlam Valley. The position of these deposits in the Quaternary framework is not certain and this highlighted the problem of correlating Quaternary successions which are beyond radiocarbon date range and do not contain tephra or other marker beds.

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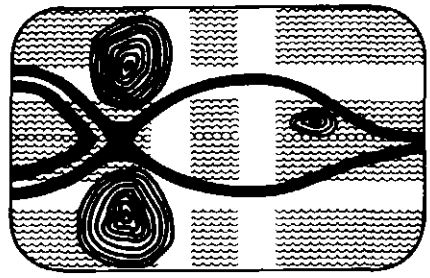

Paleontology and Biostratigraphy Seminar

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The Royal Ontario Museum in Toronto was the site for this years's Paleontology and Biostratigraphy Seminar held on November 21st and 22nd. Similar meetings have been held at various institutions in eastern and Atlantic Canada for a number of years. There is no "parent" society. This year, the Seminar was sponsored jointly by the Department of Invertebrate Paleontology of the Royal Ontario Museum and the Department of Geology, University of Toronto; Peter von Bitter, Geoffrey Norris, and Desmond Collins acting as joint convenors. Approximately 100 paleontologists attended.

Papers presented fell into three major divisions representing palaeoecology and evolution, Cenozoic and recent studies, and Paleozoic stratigraphy.

Bruce Haugh (University of Toronto) described morphologic analysis of some Mississippian camerate crinoids based on superbly preserved material containing fossilized internal "soft" parts. Not only is the internal anatomy radically different from modern crinoids, but he has discovered an apparently unique sensory system by study of pore structure of the wall and internal nerve grooves. Fixed pinnules acted as linear antennae to sense water currents and thereby change the position of the arms. Several crinoids growing close together would thus be able to form a communal baffling system to optimize suspension feeding by a mucus-net system.

Hans Hofmann (University of Montreal) has also been working on superbly preserved material. His material, however, represents the lower end of the available evolutionary and stratigraphic spectrum. Aphebian sediments, approximately two billion years old, from the Belcher Islands contain abundant stromatolites and oncolites in silicified dolomitic and evaporitic mudstone. The stromatolites and oncolites have yielded very abundant permineralized cells of blue-green algae, bacteria and possibly fungi. Hofmann pointed out that the macro-morphology of stromatolites is not useful for precise biostratigraphy, contrary to the conclusions of Soviet workers. Furthermore, the morphology of algal cells within the stromatolites suggests that little if any evolution of blue-green algae has taken place in the time interval between the Proterozoic and Recent, at least at the familial level. He documented many close similarities between recent stromatolitic microfloras and early Proterozoic ones. Of great interest was the demonstration that the so-called nuclei reported from some Proterozoic algal species are in fact degradation products of the cell contents. Hofmann was able to demonstrate this phenomenon in both decaying modern algal cells and in Proterozoic assemblages.

A neontologist's approach to phylogeny was presented by Ian Ball (Royal Ontario Museum) in a paper on derivation of phylogenetic trees using recent faunas. He indicated the problems faced by biologists in elucidating evolutionary lineages amongst organisms that leave no fossil record (his own work is concerned with flatworms), but suggested that fossils aided little in contributing a solution. He traced the impact that the early pre-evolutionary school of transcendental anatomists had had on modern phylogenetic systematics. Of particular importance in this regard is the definition and recognition of monophyly. Simpson's definition of mere common ancestry was judged to be too loose; rather, emphasis should be placed on derivation from one phyletic line, if and only if they have a common ancestor that is not also an ancestor to another group. With this stricture in mind, Ball developed the thesis that species must be defined on the basis of unique