Geoscience Canada

Hudson Bay Field Meeting

W. R. Cowan

Volume 7, Number 1, March 1980

URI: https://id.erudit.org/iderudit/geocan7_1con03

See table of contents

Publisher(s)

The Geological Association of Canada

ISSN

0315-0941 (print)
1911-4850 (digital)

Explore this journal

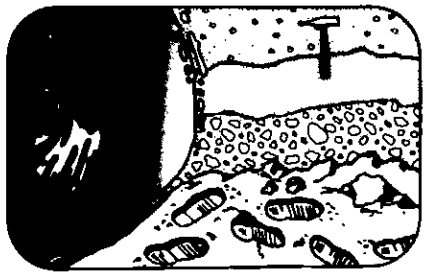
Cite this article

Cowan, W. R. (1980). Hudson Bay Field Meeting. *Geoscience Canada*, 7(1), 36–37.

with various aspects of regional Devonian sedimentation in Western Canada. Finishing up in a blaze of diagenesis were the three final papers; the first by R. A. Walls presented examples of the three major types of diagenesis (submarine, subaerial and subsurface) modifying the original depositional fabrics found in various Devonian carbonates in Western Canada. B. Osborne gave a useful account of the Devonian Slave Point sedimentation and diagenesis in the Meikle River area of northern Alberta. An extremely well illustrated presentation of diagenesis in the Swan Hills Formation in the Kaybob reef, Alberta was given by P. K. Wong. Three generations of cementation were identified; the first syndepositional, common in the reef interior facies; the second derived from mechanical-chemical compaction, found in the reef slope and adjacent reef rim as dolomite cement, or as calcite cement in the reef slope and reef interior; third generation cement was found throughout.

The Symposium, chaired by I. A. McIlreath, had something of value for all the five hundred or so geologists who attended.

MS received November 26, 1979



Hudson Bay Field Meeting

W. R. Cowan
Ontario Geological Survey
77 Grenville Street, Room 705,
Toronto, Ontario M5S 1B3

A 10 day field conference was held from June 15 - June 25, 1979 to present the results of recent research into the "Holocene Stratigraphy and Sea-Level Changes in southeastern Hudson Bay". Twenty-five participants attended from seven nations representing IGCP Project 61 (Sea Level Changes) and the Holocene, Shoreline and Neotectonic Commissions of the International Association for Quaternary Research. The trip was organized and run by Claude Hillaire-Marcel (Université du Québec a Montréal) and Jean-Serge Vincent (GSC) who were ably assisted by Bernard de Boutray (UQUAM), Pierre Guimont (La Société de Développment de la Baie James) and several support staff.

After flying from Montreal, the group set out from Matagami for a four-day 650 km trip to La Grande Riviere to study the late glacial and postglacial history of the eastern James Bay Region. Near Matagami a large north-south trending glaciofluvial complex, previously mapped as an esker, was studied. This is now referred to as the Harricana Interlobate Moraine which formed when the retreating Labrador Sector of the Laurentide Ice Sheet divided into two residual ice masses, one retreating northeasterly (New-Quebec ice) the other northwesterly (Hudson ice). Retreat was accompanied by Glacial Lake Ojibway and the deposition of non-calcareous varved clay.

Retreat of the Hudson ice was accompanied by as many as three glacial readvances toward the southeast about 8,200-8,000 radiocarbon years B. P. (Cochrane I, Rupert, and Cochrane II: Hardy, 1977; Prest, 1970) Calcareous clay till was deposited (Cochrane till) and Lake Ojibway sediments changed from non-calcareous to calcareous, the limestone component being derived from the western James Bay Lowland. Calcareous Ojibway clays extend northerly to at least Great Whale River. Though these readvances are interpreted as surges into Lake Ojibway, the exposed rock at higher altitudes is strongly striated, the drift is fluted or drumlinized, and the Cochrane till is largely basal in origin showing little evidence of subaqueous deposition. The surging mechanism proposed by trip leaders was that residual Hudson ice had rapidly retreating ice margins due to calving on the south (Lake Ojibway) and the north (sea) causing a positive anomaly towards the ice centre and an overall instability. Resultant surging caused rapid thinning which allowed for the very rapid subsequent disintergration of the ice.

Travelling northward, the Tyrrell Sea sediments and the Sakami Moraine were studied. The contact between the Tyrrell Sea and Lake Ojibway sediments is marked by a bed of coarse sand containing limestone pebbles, derived from the Cochrane readvance, and clay pebbles eroded from the Lake Ojibway clays. This is present as far north as Great Whale River. This conglomeratic unit was interpreted as marking the drainage of Lake Ojibway into the Tyrrell Sea in northeastern Hudson Bay as the Lake level fell several hundred feet to sea level. This contrasts with Skinner's (1973) interpretation of similar sediments in the Moose River Basin (Ontario) which he attributed to density underflows of marine waters into the fresh waters of Lake Barlow-Ojibway.

The Sakami Moraine is a narrow, arcuate ridge trending north-westerly toward Great Whale River. Its remarkable shape is interpreted as indicative of an equilibrum profile of the New Quebec ice, formed when the ice-margin was afloat and calving into Lake Ojibway. Drainage of the Lake into the Tyrrell Sea caused a water lowering of up to 150 metres with subsequent grounding of the ice front. The Sakami Moraine apparently marks this grounding position and has been described by the field trip leaders as a "re-equilibrium moraine". In many ways this moraine is similar to very long, narrow, arcuate moraines in northwestern Ontario which were fronted by Glacial Lake Aggassiz and associated lakes; the mode of formation is probably similar.

At Great Whale River the stratigraphy of the Tyrrell Sea sediments, the basal conglomeratic unit and the Lake Ojibway clays were studied further. These imply an embayment of Lake Ojibway in southeastern Hudson Bay between the Hudson and New Quebec ice masses and that the Tyrrell sea first entered Hudson Bay from the Hudson Strait area along the east side of the Bay. Terrace deposits related to lowering sea level (rising land) were also examined.

However, the highlight of this part of the trip was the study of the magnificent, raised shoreline features in the area and particularly at Richmond Gulf. Marine limit for the Tyrrell Sea is as much as 315 m above present sea level in the area and as many as 185 strandlines provide a continuous record of emergence from about 8,000 sidereal years B.P. to the present. Radiocarbon dates have indicated a possible periodicity of 45 years for shoreline development; this has been attributed to storm periods and high tides perhaps related to a so-called "double-Hale cycle" of solar activity (Hillaire-Marcel and Fairbridge, 1978). Though the merits of curve fitting and smoothing were debated considerably, all participants were impressed with the nature of the field evidence and the detailed field surveys and analyses.

As a bonus for those interested in neotectonics, evidence of postglacial rock fracturing, primarily due to isostatic effects, was demonstrated throughout the area. Those who oppose the burial of nuclear wastes in fracture-free, homogeneous granitic rock were happily arming themselves with photographs of such features.

The trip was a tremendous success with every logistical detail covered. For those uninitiated to Arctic and Subarctic conditions diversions such as black bears, canoe trips in sea ice, bunk house fires, and coastal flying in new zero-zero conditions were arranged. Reportedly the first North American Excursion of the Shoreline Commission, the standard has been set at a high level. The leaders are to be congratulated for their efforts. The trip was heavily subsidized and supported by federal and provincial government agencies, various Quebec universities, the James Bay Energy and Development Corporations, numerous individuals, and the dynamic Quebec Association for Quaternary Studies.

References

Hardy, L., 1977, La déglaciation et les épisodes lacustre et marin sur la versant québécois des basses terres de la baie de James; Geographie physique et Quaternaire, v. XXXI, no. 3-4, p. 261-273.

Hillaire-Marcel, C., and R. Fairbridge, 1978, Isostasy and eustasy of Hudson Bay; Geology, v. 6, p. 117-122.

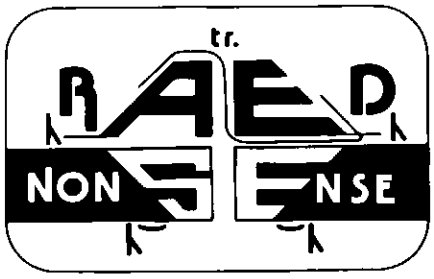
Hillaire-Marcel, C., J. S. Vincent, *et al.*, 1979, Holocene stratigraphy and sea level changes in southeastern Hudson Bay, Canada: Guidebook for Hudson Bay Field Meeting, edited by AQQUA, Montreal, 177 p.

Prest, V. K., 1970, Quaternary geology of Canada; Chapter XII in Geology and Economic Minerals of Canada: Geol. Survey Canada, Economic Geology Report, No. 1, 5th Ed., p. 676-764.

Skinner, R. G., 1973, Quaternary stratigraphy of the Moose River Basin, Ontario: Geol. Survey Canada Bull. 225, 77 p.

Vincent, J.-S., and L. Hardy, in press, The evolution of Glacial Lake Barlow and Ojibway in Ontario and Quebec: Preprint of Geol. Survey Canada Bull. 316, 18 p.

MS received September 7, 1979



Earthbound Editing

Catharine Findlay,
Publications Officer,
Alberta Oil Sands Environmental Research Program,
15th Floor, Oxbridge Place,
9820 - 106 Street,
Edmonton, Alberta T5K 2J6

Approximately 120 delegates, mainly from various parts of the United States and Canada, attended the 13th Annual Conference of the Association of Earth Science Editors in Tulsa, Oklahoma (October 14-17, 1979). Unfortunately, budget cutbacks resulted in a dearth of representatives from Canada's Federal Government departments, including the host of next year's conference in Halifax. Sessions on such varied topics as publishing innovations, the roles of editors, and how to write a scientific paper allowed the delegates to put on their thinking caps and to participate in some lively discussions.

Innovations in Editing and Publishing

A short history of printing from the viewpoint of the publisher was presented by William Kaufmann (William Kaufmann, Inc.). Quoting from the "History of Scholarly Publishing", published by Associated University Presses, Kaufmann outlined some of the highlights of the early printing industry. One of the first innovations came when an editor demanded that manuscripts be submitted double-spaced, using only one side of the stone. This was followed many years later by the invention of the word "ibid." (This invention has become almost a disease!) However, one of the most notable events was the first printing subsidy - a government grant to purchase umlauts!

On the serious side, Kaufmann cited two innovations which dramatically changed the industry and which proved to be of great value to geoscientists. The first, which took place in the mid-17th Century, was the development of illustrations in books and the second was the use of colour. Could the geosciences have developed without coloured maps, cross-sections, etc.?