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DEGLACIATION OF THE EDMUNDSTON AREA
AND REAPPRAISAL OF GLACIAL LAKE MADAWASKA INTERPRETATION

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The history of Glacial Lake Madawaska is closely linked to the last deglaciation in Central and Northern New Brunswick as well as in Northern Maine. New evidence suggest its outlet may have been to the north, across the Appalachian Mountains, into the St. Lawrence Valley (Gauthier, 1980). This hypothesis will be investigated during the coming 1980 field season and in the light of mapping by Thibault (1979, 1980). The main implications of a northward outlet are: 1) persistence of ice in Central New Brunswick and the consequently limited (if not inexistent) influence of the Laurentide ice during deglaciation, and 2) damming of the St. John River by ice in the Grand Falls region and resulting in the the formation of Glacial Lake Madawaska.

Chalmers (1885, p. 41-42 GG) described "chains of lakes" formed in Saint John Valley behind drift dams (the most prominent one being a frontal moraine (Lee, 1959) at Grand Falls). Breaching of the drift in the valley gradually lowered the lake level and drainage was established along a new course. Kiewiet de Jonge (1951) traced the extent of this lake up to Lac Témiscouata, Quebec and gave it the name: "Glacial Lake Madawaska"; he recognized only one single phase related to the existence of the lake. Lee (1953, 1955) confirmed this interpretation and traced the extent of the shoreline deposits in the region of Edmundston. Martineau (1979) observed rhythmite deposits in the Lac Témiscouata area; he also reported the existence of two opposite glacial flows in the area: an early flow towards the southeast (Laurentide ice) followed by a flow with reversed direction (Appalachian ice). Martineau did not present the potential regional implications of his finding.

In August 1979, during a one day field trip excursion in the area around Edmundston, several striation sites were observed. Convincing evidence of striated and polished outcrops indicate that glacial flow was active towards the west and the northwest, controled by the orientation of the Saint John Valley and some of its tributaries. Sites were observed along the Madawaska and the Iroquois valleys (six sites with northwest flow) as well as along the Saint John River near the city of Edmundston (three sites indicated a westward flow). No other flow direction was noted, and all striated outcrops reflected a single ice flow direction (with maximum variations in the order of 20 degrees). Sense

of flow was obtained from numerous and distinctive characters: on a microscale, crag-and-tail and nailhead features, and plucking of lee sides of outcrops; on a macroscale, well developed stoss-and-lee relationships on outcrops, producing whalebacks and roches moutonnées. Although the number of observation sites is small, it is believed on the basis of 1) the uniformity of the various observations, 2) the intensity of the erosional features, and 3) the absence of other movements, that the stiae represent the last glacial flow in the area, and that this flow was channelled by the major valleys of the area.

Implications of the New Observation

The present observation suggests a new interpretation of the mode of deglaciation of the Saint John Valley and of the origin of Glacial Lake Madawaska. In order to generate a northwestward-moving ice mass, the glacier would have had to be centred over the highlands of central New Brunswick (and Maine?) and it would have had to flow radially in several directions. At one time, the frontal position of the ice was located in the Grand Falls area, forming the so-called Glacial Lake Madawaska by ice damming the valley. Subsantiating evidence has been collected on the east side of the hypothetical icemass in the Bathurst area (Gauthier, 1979 and 1978).

The region of Plaster Rock (28 km east-southeast of Grand Falls) presents a set of discontinuous morainic ridges with a relief locally greater than 60 m. From limited evidence gathered in the field (one transversal section) glaciofluvial stratification in the moraines (beds dipping at 5-20 degrees towards the west) indicates ice localized to the east side of the moraines. The ice contact ridges, in spite of their high relief (greater than 60 m), have no obvious regional extent; nevertheless, they seem to represent a position of an ice cap centred in the New Brunswick Highlands.

Field trip

The trip logs will be presented at the end of the summer, following the summer's field work in the area. Conclusions will be reached at that time concerning the significance of the westward glacial flow and its regional extension. Classical sections along the St. John River at Grand Falls, striation sites, the Plaster rock moraines and related observations will be included in the trip.

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