

CORRESPONDENCE

The Editor,

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SIR, *Direction of glacial flow across Hans Island, Kennedy Channel, N.W.T., Canada*

During a 1981 field trip to Hans Island* (Fig. 1), I had the opportunity to observe evidence of considerable glacial action across the summit plateau. The island is almost circular, measuring approximately 1 km in diameter, and is surrounded on nearly all sides by vertical cliffs in excess of 130 m. It lies equidistant from Greenland and Ellesmere Island, close to lat. 81° N. in Kennedy Channel, standing in water in excess of 500 m. Its eastern, southern, and western aspects present towering cliffs with no beach at all; only on the northern side does the land slope at a walkable angle to the sea. The bedding planes in the limestone making up the island bedrock are evident in the cliffs. Freeze-thaw erosion has resulted in the inclined north slope being covered in small scree.



Fig. 1. Aerial view of the 1 km wide Hans Island in Kennedy Channel, seen from the east. The steep slopes of the southern and eastern sides drop vertically into the sea. The limestone bedding planes dip to the north (right) at a gentler angle, allowing an ice beach to form at the water's edge. At the centre of the island, glacial scours in the exposed bedrock of the upper plateau indicate that the most recent ice movement over the island was from south-south-west to north-north-east (left to right). (Photograph by courtesy of Dome Petroleum Ltd.)

* The island was discovered in August 1872 by the North Polar Expedition in the U.S. ship *Polaris* (Captain C. F. Hall), and named after Hans Hendriksen, Greenlandic guide on the expedition and subsequently on the British Arctic Expedition, 1875–76. According to legal authority in Ottawa, "Canada exercises sovereignty over Hans Island, and it is part of Canadian territory". It is so shown on Canadian maps and charts.

The highest point on the island (200 m) is surrounded by a fairly level area which is characterized by extensive bedrock outcrops. Everywhere there are long scours in the rock parallel to the direction of Kennedy Channel (south-south-west to north-north-east). Most of the grooves are between 5 and 20 cm in width, 2–5 cm in depth, and extend between 1 and 5 m in length. A number of converging grooves, forming Y's, were seen, in each case with the stem to the north and the branches to the south. Ripples within the scours were inconclusive as to the direction of the ice movement. Excavated steps, generally found on the lee slopes of glacial action, were found only to the south of the summit, but were large (2 m) and are likely the result of weathering of the exposed bedding-plane edges rather than from glacial motion in a southerly direction.

The island is covered by erratics of varying sizes: from 2 cm to 2 m in diameter. These are predominantly of a red granitic rock, although there were also some dark gneiss fragments with large garnets (4 mm across in some cases). The gneiss is generally soft and friable. It seems likely that these erratics originated in the Bache Peninsula–Pim Island area or even farther south. Another possible source is the bedrock beneath Humboldt Glacier. Their presence leads to the conjecture that at whatever time the island was last glaciated the ice movement was from south to north—from Kane Basin to Robeson Channel. This is supported by the Y scours in the rock, implying ice movement to the north.

Other points of interest are the conspicuous white bivalve fossils seen wherever the grey bedrock is exposed. The fossils vary in size across the shell from 5 to 20 cm and generally form heart-shaped patterns in the top slopes of the island. Examination of them in the lower cliffs reveals that they lie vertically orientated, so that when sectioned by glacial action they present this curious cross-section.

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