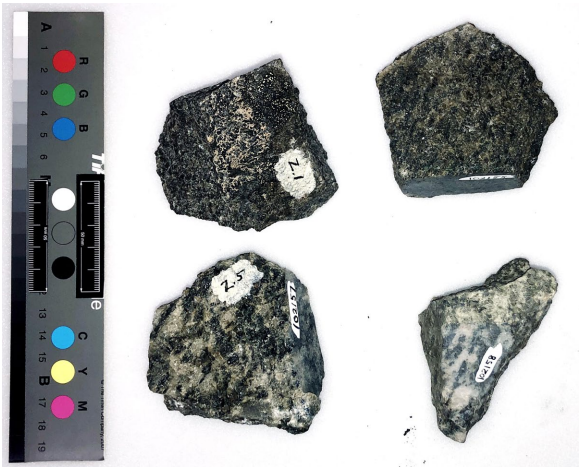
Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.38342



Odell in the Torngats, 1931: charnockites of Mount Razorback and the formation of the North Atlantic Craton

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The Torngat Mountains of the northernmost Labrador coast remain a little-studied part of the Canadian Shield, despite preserving a record of crustal growth and maturation that extends from the beginning of the Archean to the Paleoproterozoic. A notable transition in geology occurs at Nachvak Fjord, across which the Eoarchean to Neoarchean grey TTG gneisses of the Saglek Block change into dark granulites along a possible low-angle contact. In 1931, the Forbes-Grenfell Expedition explored the Labrador Coast, and geologist/mountaineer Noel Odell made ascents of several peaks, including Mt Razorback at the northern mouth of Nachvak Fjord and Mount Tetragona further inland, where the Archean gneisses of the Four Peaks Domain are reworked by the Paleoproterozoic Torngat Orogen. A new examination of archived samples collected by Odell confirms his identification of both magmatic and metamorphic types of charnockites [1]. Zircon dated by ion microprobe provides ages of ca. 2750Ma for plutonic enderbite on Mount Razorback and 2720Ma for granulite-grade deformation and metamorphism, synchronous with magmatism and deformation in the Saglek Block further south [2]. Rocks of similar metamorphic grade and age form the northernmost part of the North Atlantic Craton near Kangerlussuaq, southwest Greenland, where they are thrust under Archean gneiss that has been reworked into the Paleoproterozoic Nagssugtoqidian orogen. Unlike Greenland, however, where Neoarchean protoliths are assigned to the Rae Craton to the north of Kangerlussuaq, there is no Paleoproterozoic suture along Nachvak Fjord, and the new dating confirms that gneisses and granulites to the north have Neoarchean protoliths as part of the North Atlantic Craton. This raises the possibility that the association between parts of the Rae and North Atlantic Cratons predates a post-Archean assembly, with the charnockitic rocks being the exposure of a deeper section of a ca. 2.7Ga orogen in both. After almost a century, Odell's pioneering fieldwork has produced new insights.Thanks to the Sedgwick Museum of Earth Sciences, University of Cambridge, for access and collaboration. Supported by Swedish Research Council grant 2025-06170 to MJW.

[1] Odell (1938), In: *Am. Geog. Soc. Spec. Pub.* 22, 187-215.
[2] Dunkley et al. (2020), *J. Geol. Soc.* 177, 31-49.