

Geology of the Nilsen Plateau, Queen Maud Mountains, Transantarctic Mountains

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Abstract - The western escarpment of the Nilsen Plateau, Queen Maud Mountains, Antarctica, consists of basement igneous and low-grade metasedimentary and metavolcanic rocks overlain by a near-horizontal Permian-Triassic sedimentary sequence intruded by Jurassic diabase sills. The basement comprises metasedimentary rocks of Neoproterozoic to earliest Cambrian age and Lower Cambrian metavolcanic rocks intruded by Cambrian to Lower Ordovician granitoids. An erosion surface cut across the basement is overlain by 600+ m of strata comprising Lower Permian glacial beds (Scott Glacier Formation) and overlying post-glacial shales (Mackellar Formation) that are succeeded by fluvial-deltaic beds of the Fairchild Formation and the Upper Permian fluvial, coal-bearing Queen Maud Formation. Some of the glacial beds and the post-glacial shales were deposited in a large fresh to brackish water sea with probable marine connections. Deposition initially filled topographic lows on the basement surface. Increased subsidence and a reversal in paleoslope occurred during the deposition of the Queen Maud Formation as the region developed into a foreland basin resulting from tectonic activity along the Panthalassan margin of West Antarctica. The Queen Maud Formation is overlain disconformably by non-carbonaceous, fluvial beds of the Fremouw Formation. Silicified wood, probably Permian *Glossopteris*, in the lower part of the formation, and a report of Triassic vertebrate fossils, suggests that the Permian-Triassic boundary is within the lower Fremouw Formation. Ferrar diabase sills, cumulatively as much as 500 m in thickness, were intruded into the sedimentary sequence in the Jurassic. Basement rocks are cut by pre-Permian faults and the whole succession is displaced by post-Jurassic, probably Cenozoic, faults.

INTRODUCTION

This paper is based on fieldwork conducted by William E. Long and Douglas McLelland in the 1963-64 field season at the Nilsen Plateau in the Queen Maud Mountains of the Transantarctic Mountains (Fig. 1). A geological sketch map was compiled by Long and McLelland (1964). Subsequently a draft manuscript on the Permian-Triassic Beacon strata was prepared by Long (1965), and the basement geology was described in McLelland's MS thesis (1967). Both the draft manuscript and the geological sketch map are lodged in The Ohio State University's Knowledge Bank. There has been no comprehensive survey of the Nilsen Plateau since that time, and therefore this information fills a gap in the regional geology between the Scott Glacier and Shackleton Glacier regions. Like much of the Transantarctic Mountains south of the Byrd Glacier, the Nilsen Plateau exposes a pre-Devonian basement overlain by Permian-Triassic sedimentary strata that have been intruded by Jurassic sills (Fig. 2).

Fig. 1 - Location map for the Nilsen Plateau, Transantarctic Mountains. CTM: central Transantarctic Mountains. NVL: north Victoria Land. SVL: south Victoria Land.

