

NOTES

THE AGE OF THE METAMORPHIC COMPLEX OF NORTHERNMOST ELLESMERE ISLAND*

Among the geological results of the Nares Expedition of 1875-76 to northern Ellesmere Island was the mapping of an area of mica schists and other altered rocks between Stubbs Point and Markham Inlet¹, and in the same general area Peary² noted the presence of igneous rocks. These observations led Schuchert³ to postulate a borderland of Archaean rocks, the supposed source of the sediments deposited in the Franklinian Geosyncline, to which he gave the name "Pearyea".

Recently the Precambrian age of these rocks has been questioned and the view has been expressed that the metamorphic rocks of northern Ellesmere Island are merely highly metamorphosed Palaeozoic strata. Support for this view comes from north Greenland where it appears that Palaeozoic beds can be traced into regions of metamorphic strata.

In 1953 the writer⁴ mapped a group of migmatites and gneisses between Cape Aldrich and Markham Inlet and named them the Cape Columbia group. Christie⁵ continued geological mapping in the area during the 1954 field season and extended the group to include all rocks of advanced metamorphic grade. He mapped outcrops of the Cape Columbia group between Cape Aldrich and Cape Albert Edward, on Ward Hunt Island, at the head of M'Clintock Inlet, and between Ayles Fiord and Phillips Inlet. He also found a conglomerate containing pebbles of Cape Columbia group rocks in what he named the M'Clintock group; on other evidence the M'Clintock group was shown to be older than the Middle Ordovician. Christie also found fragments of metamorphic rocks in a fossiliferous conglomerate in the Challenger group of

Upper Ordovician age. Thus from geological evidence it was possible to state with some confidence that the age of the Cape Columbia group was pre-Ordovician.

A specimen of biotite-rich gneiss was recently submitted by the writer to the Isotope and Nuclear Research Section of the Geological Survey of Canada for age determination using the potassium-argon method, which gave an age of 545 million years. The significance of this result in terms of geochronology is discussed in the remaining part of this note.

The geological time scale has been subject to some revision in recent years. Kulp⁶ in an article on isotopic dating and the geologic time scale indicated that at that time, late Precambrian time was thought to extend from 700-500 million years ago. However, in 1955 the potassium-argon technique was still being developed and the time scale in use was based mainly on lead isotope-ratio methods. Recent papers show a considerable divergence of opinion regarding the date of the base of the Cambrian period. Mayne, Lambert, and York⁷ suggested that the time scale be expanded, and they placed the middle of Upper Cambrian time at 650 million years later rather than at 450 million years as proposed by Holmes⁸. Kulp, *et al*⁹ in replying to this paper pointed out erroneous assumptions made by the Oxford group and suggested that the Kolm, in the Upper Cambrian black shales of Sweden, has a minimum age of about 500 million years. Davidson¹⁰ presents a table listing results from various investigating groups; his data for the Cambrian are presented below.

Mid-point of the Cambrian period
(m.y.)

			Recent Experiments
Holmes	Belousov	Oxford	
470	423	700	513

* Published by permission of the Director, Geological Survey of Canada.

It seems obvious that investigations now in progress in a number of laboratories of the age of stratigraphically well-defined rocks will soon permit a much better definition of the time scale.

If we accept the consensus of current thought, it appears probable that the last metamorphism to which Cape Columbia group rocks were subjected occurred in lowermost Palaeozoic time or uppermost Precambrian time; the rocks themselves may be much older as the method dates only the most recent metamorphism.

The existence of metamorphosed strata in northern Ellesmere Island suggests that orogenic forces may have been involved and the resulting land-mass may have been the source of the clastic sediments that Thorsteinsson and Tozer¹¹ note in the Parry Islands and Ellesmere Island. By the close of the Palaeozoic era, the area occupied by the Cape Columbia group rocks had been lowered and limestone of Permian age was being deposited with angular unconformity on the gneissic and other metamorphic rocks of the Cape Columbia group.

R. G. BLACKADAR

¹Feilden, H. W. and C. E. De Rance, 1878. Geology of the coasts of the arctic lands visited by the late British expedition under Captain Sir George Nares. *Quart. J. Geol. Soc.* 34:556.

²Peary, R. E. 1907. *Nearest the Pole*. London: Hutchison and Co., pp. 213, 231.

³Schuchert, C. 1923. Sites and natures of North American geosynclines. *Bull. Geol. Soc. Am.* 34:151-230.

⁴Blackadar, R. G. 1953. Geological reconnaissance, north coast of Ellesmere Island, N.W.T. *Geol. Surv. Can. Pap.* 53-10.

⁵Christie, R. L. 1957. Geological reconnaissance of the north coast of Ellesmere Island, N.W.T. *Geol. Surv. Can. Pap.* 56-9.

⁶Kulp, J. L. 1955. Isotopic dating and the geological time scale. *Geol. Soc. Am. Sq. Pap.* 62:609-30.

⁷Mayne, K. I., R. St. J. Lambert, and D. York. 1959. The geological time scale. *Nature* 183:212-14.

⁸Holmes A. 1947. The construction of a

geological time scale. *Trans. Geol. Soc. Glasgow.* 21:117-52.

⁹Kulp, J. L., J. C. Cobb, L. E. Long, and D. S. Miller. 1959. The geological time scale. *Nature* 184:BA62-3.

¹⁰Davidson, C. F. 1959. The geological time scale. *Nature* 184:1310.

¹¹Thorsteinsson, R. and E. T. Tozer. 1960. Structural history of the Canadian Arctic Archipelago since Precambrian time. *Geol. Surv. Can. Pap.* 60-7.

ANDREW GRAHAM, THOMAS HUTCHINS, AND THE FIRST RECORD OF PEARY'S CARIBOU

The eighteenth century naturalist Thomas Pennant published the following note in 1787:

"Mr. *Hutchins* was presented, by the *Weahipouk Indians*, with a Deer four feet eight inches long and three feet two high. It was entirely white, except for the back which was mottled with brown. The fur was short and fine like that of the Ermine. The Indians, in their manner of expression, said it came from a place where there was little or no day." (Ref. 2, p. 51).

This description sounds extremely like Peary's caribou, but there are obvious difficulties in accepting it as the first record of that remote species of deer. Who, it must be asked, were the "Weahipouk" Indians? How were any Indians able to secure the skin of an animal that lived north of the range of most Eskimos? And how did they come to make a present of it to Dr. Thomas Hutchins who spent most of his time in America at Fort Albany on James Bay and was never at any time north of Fort York? (Ref. 4, p. 263, note 1).

Through the kindness of Miss Alice Johnson, archivist of the Hudson's Bay Company, it has become possible to answer these questions and also to assert that Pennant's note is indeed the earliest description of Peary's caribou, although an inaccurate one.

The archives of the Hudson's Bay Company possess twelve manuscript volumes entitled *Observations on Hudson's Bay*. The three earliest are by