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The Hudson Bay Project*

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Marine geological work in Hudson Bay was undertaken in 1961 and 1965. The writer took part in both cruises, accompanied on the first by his former colleague DR. R. J. LESLIE. The studies included investigation of raised beaches, bathymetry, water chemistry, investigations of both planktonic and benthonic organisms, current measurements, bottom photography and bottom sampling by means of snapper samplers, dredges and cores. Geophysical research to support the project was also carried out with the aid of both bottom and surface gravimetry, air and sea-borne magnetometers, deep crustal and shallow seismic surveys, and sub-bottom profiling in unconsolidated sediments as well as bedrock structures. The M/V Theta (in 1961), the M/V Theron and the CSS Hudson (in 1965), launches, a helicopter and a North Star four-engined aircraft were used to support the overall project.

Bathymetric contours are concentric to the periphery of the bay, ranging down to approximately 200 metres. Long submarine ridges and valleys disrupt the uniform saucer-shaped appearance of the floor of the bay, and this is further dissected by a submerged Tertiary drainage system.

Bottom sediments in Hudson Bay are generally coarser in shoal and peripheral areas. Ice-rafted sediments tend to mask the normal marine

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distribution in these areas. This earlier work by Leslie and the writer is summarized in PELLETIER (in press). A highly oxidized upper layer conforms to areas occupied by highly oxygenated waters which are found over the shoal and peripheral areas of the bay. A faunal zonation also occurs, as reported by LESLIE (1965).

Bedrock studies supported by geochemical investigations, photographs and bathymetric records indicate the major portion of Hudson Bay to be underlain by Paleozoic carbonate rocks. The eastern portion from the Ottawa Islands and Belcher Islands to the mainland, and the western portion between Churchill and Chesterfield Inlet are underlain by Precambrian volcanic rocks, quartzites, siltstones and carbonate rocks. This has been reported by LESLIE and PELLETIER (1965), and in abstract form by the writer to the International Oceanographic Congress (Moscow, 1966).

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Hudson Bay Project: Sub-Bottom Profiling

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Approximately 1125 miles of sub-bottom reflection profiling were completed as part of the Hudson Bay Project, from July to September, 1965. This program was designed to examine the thickness and lithology of unconsolidated bottom sediment in Hudson Bay, the configuration of the sub-bottom bedrock surface, and bedrock lithology and structure.

Along the tracks surveyed, this profiling method was successful in determining contacts between Precambrian and Paleozoic rocks, and in defining the attitude of the Paleozoic strata. The maximum accumulation of bottom sediment recorded was in the order of 30 metres.

The interpretation of these recordings is continuing in conjunction with examination of the echo-sounding records of CSS Hudson and M/V Theron, and the sediment samples collected from these vessels.