

and other instruments it was necessary first to break the ice by hand with a 15-ft. section of drill rod and then pour 5 to 10 gal. of diesel oil into the hole, mixing it well with the slush.

It is concluded that the Model V-100 Houston drill offers a satisfactory means of drilling in cold ice to depths of at least 100 ft. when used in its "pressure mode". A single hole can be drilled in about 3 hours with a two-man crew, but at that rate it is exhausting work. A considerable improvement could be gained by housing the drill in a heated wanigan. With this arrangement and relief crews and without mechanical breakdowns, it is estimated that as many as five or six holes could be drilled through ice island T-3 per day.

The author wishes to acknowledge the excellent support services of the Arctic Research Laboratory in making this test possible. The other members of the drilling crew were Donald M. Johnson and Charles R. Greene, both of the GM Defense Research Laboratories, General Motors Corporation. The test was conducted under contract Nonr 4322(00) with the Office of Naval Research.

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<sup>1</sup>Muguruma, J., and K. Higuchi. 196 . Glaciological studies of the ice island T-3. *J. Glaciol.* 5:709-30.

<sup>2</sup>Crary, A. P. 19 . Seismic studies on Fletcher's ice island T-3. *Trans. Am. Geophys. Union* 35:293-300.

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### Correction

The author of the paper "General ecology and vascular plants of the Hazen Camp area", which appeared in *Arctic* 17:237-58, wishes to point out that through an oversight caused by altered publication arrangements, an acknowledgement to the Defence Research Board of Canada and particularly to Dr. G. Hattersley-Smith was omitted. Their generosity in allowing the facilities at Hazen Camp to be used is greatly appreciated.

### NOTES ON THE SCIENTIFIC RESULTS OF THE UNIVERSITY OF OTTAWA EXPEDITION TO SOMERSET ISLAND, 1964

The general aim of the expedition was to study the geology and geomorphology of northern Somerset Island<sup>1</sup>, with a view to extending work into other parts of the Precambrian highlands in later field seasons.

The expedition arrived at Somerset Island on 11 June 1964 and left on 14 August. A rapid examination by helicopter of the north coast between Aston Bay and Prince Leopold Island provided valuable data on local topography, surficial and solid geological formations and eskimo sites.

### Geology of the Aston and Hunting formations

These strata were first mapped during "Operation Franklin" and a Proterozoic age was presumed. Blackadar<sup>2</sup> later carried out further examination, noting the large numbers of gabbro dykes and sills and the difficulties encountered in distinguishing between the gneisses of the Archaean and the overlying quartzites of the Aston formation.

Sections in the two formations were studied in detail and the entire outcrop area on the southern flank of Aston Bay was covered. The Aston formation is a generally coarse red sequence of quartzitic sandstones and grits. Cross-stratification together with other sedimentary features, was studied where possible. Stromatolites of a columnar type are locally common.

A covered interval of 100 feet between the Aston and the Hunting formations appears to be occupied by argillaceous rocks.

The Hunting formation comprises a sequence of 3,000 feet of limestones and dolomites with very minor intercalations of shale. The limestones show many features of shallow water deposition and algal activity. Detailed studies of these rocks will be continued, with special attention given to their mode of origin.

### Geology and Palaeontology of Palaeozoic Formations

The Read Bay and Peel Sound formations were examined in the northeastern quarter of the island and a collection of fossils was made whenever possible. The junction of the Palaeozoic rocks with the (Precambrian) Hunting formation in the Hunting valley was examined but its exact nature is still somewhat uncertain. It is not faulted nor is there any obvious unconformity. Fossils found nearby seem to indicate a late Ordovician or early Silurian age. Collections were also made on the northeastern flanks of Aston Bay and near Cunningham Inlet on the north coast. At the latter locality a *Conchidium* biostrome was examined. There appears to be an unbroken facies change between the marine Read Bay formation and the non-marine Peel Sound formation as seen near Cunningham Inlet and near Limestone Island. From horizons well within the Read Bay and at many levels up into the lower part of the Peel Sound formation large numbers of ostracoderm fishes have been obtained, being mostly members of the Cyathaspididae, Traquairaspididae and Corvaspididae and including several new species. Eurypterids, gastropods and ostracods were also found. The arbitrary base of the Peel Sound formation appears to correspond to a horizon low in the Downtonian stage, i.e. it approximates to the Siluro-Devonian boundary. No fossils younger than Downtonian were recognized.

The palaeozoic strata of northwestern Somerset Island form a gentle broad syncline<sup>3</sup> west of Cunningham Inlet, but between the south west corner of the Inlet and a point some six miles on the coast west of the Inlet runs a narrow fault-delineated belt in which dips are high and complex faulting occurs. Inliers of the Peel Sound formation are involved and intrusive masses of gypsum have been found.

Future work, it is hoped, will involve extensive collecting of further ostracoderms, particularly from the lower horizons within the Read Bay formation. A search for fishes at higher levels

within the Peel Sound formation is also very likely to be fruitful.

### Geology of the Stanwell-Fletcher Lake Basin

Stanwell-Fletcher Lake is a roughly rectangular body of water some 50-60 miles south of Aston Bay and lies within the outcrop of the crystalline rocks of the Boothia Arch. For some 10-12 miles to the north of it is a roughly square outcrop of Tertiary sediments, an outcrop previously regarded as of Lower Palaeozoic age. This Tertiary material comprises at least 650 ft. of friable grits, sandstones, siltstones and clays, and has yielded fossil plant remains and vertebrates. It appears strongly to resemble the Eureka Sound formation of Ellesmere Island. The tectonic setting of these strata, together with the position and nature of the junction between the crystalline rocks and the Palaeozoics to the east of the arch between the lake and Creswell Bay has been prospected with a magnetometer. The basin in which the lake occurs appears to be a true rift in the Boothia Arch and perhaps analogous to a much smaller feature on Devon Island<sup>4</sup>.

During the coming field season it is hoped that details of the Tertiary succession will be studied together with the wide variety of sedimentary structures and fossils present. Additional work on local tectonics will be carried out and the depth of lake water and the unconsolidated lake sediment in it surveyed.

### Geomorphology

Following is a brief summary of the work undertaken in this field.

The terrain between the Hunting Valley, Limestone Island and Cunningham Inlet was examined in a fairly extensive reconnaissance, special attention being given to river valley type, terrace and delta features within the valleys and the development of hill slopes.

Shells were collected from a number of elevated sites, particular attention being given to the gathering of shells from the highest altitudes on any given traverse. The maximum elevation at which shells were found was approxi-

mately 500 ft. above sea level. Whale bone was also collected at heights well above 65 ft. The shell locations were frequently above the elevations of clearly marked raised strandlines. The faunas include a large number of species; pelecypods dominate but gastropods and cirripedes also occur.

Limestone studies were based upon the collection and analysis of water samples from a variety of sites to determine calcium and magnesium content. The degree of dolomitisation of bedrock varies from one stratigraphic unit to another, but the total magnesium and calcium carbonate in solution was in the order of 80 p.p.m., Ca/mg. ratios varying from area to area. Solutional erosion is thought to be dominantly of a superficial nature. Minor solutional features occur on upper surfaces of pebbles whilst lower sides show none and are often areas of secondary calcite deposition. Limestone plates associated with the lowest raised beaches show extensive weathering and indicate that the solutional activity is relatively rapid.

#### Note on Geomagnetic Prospecting

A Sharpe Fluxgate PMF3 Magnetometer was used in traverses across suspected important geological junctions and seems to have provided satisfactory data at a number of localities. It was used in a 15 mile traverse west across Peel Sound from Cape Granite, at Stanwell-Fletcher lake and Creswell Bay, at Aston Bay and at Cape Anne. While this instrument was in use on certain of these traverses readings were also taken on a stationary Sharpe A3 magnetometer at base camp or at Cape Anne. This allowed some appreciation of the local magnetic weather to be made and it was also found that when working between 10:30 p.m. and 6 a.m. magnetic weather was less troublesome. Records from the magnetic observatory at Resolute Bay are also being used to assess corrections to be made to the readings on the prospecting instrument.

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<sup>1</sup>Dineley, D. L. 1965. University of Ottawa Expedition to Somerset Island, N.W.T., Canada. The Polar Record. (in press).

<sup>2</sup>Blackadar, R. G. and R. L. Christie. 1963. Geological Reconnaissance, Boothia Peninsula, and Somerset, King William and Prince of Wales Islands, District of Franklin. Geol. Surv. Can. Pap. 63-19.

<sup>3</sup>———. Map: Somerset Island and Prince of Wales Island, District of Franklin, N.W.T. (1" : 8 mi.) 37-63. Filed with Geol. Surv. Can. Pap. 63-19.

<sup>4</sup>Fortier, Y. O. *et al.* 1965. Geology of the North-central part of the Arctic archipelago, Northwest Territories (operation Franklin). Geol. Surv. Can. Mem. 320.

#### Seventh 'Order of Lenin' for Polar Explorer

Ivan Papanin, the oldest Soviet polar explorer, has just received his seventh Order of Lenin — the Soviet Union's highest award — to mark his 70th birthday.

Papanin made world headlines 27 years ago, when he headed the first North Pole drifting research station. With his three companions, Krenkel, Shirshov and Fyodorov, he drifted over 1,500 miles from the North Pole to Greenland in the course of nine months. In 1940 he supervised the rescue of the icebreaker *Georgi Sedov* which had been icebound in the Arctic for three years. On both occasions he received the Hero of the Soviet Union Award.

Papanin scorns retirement. He is still taking part in the Academy of Sciences' sea research, helping to plan routes for the new *Vityaz* and the non-magnetic schooner *Zarya*.

Soviet News Bulletin

#### Note on cover picture

One of the Foraminifera (*Cornuspiroides striolata* (Brady) 1882) found by a group of biologists from the University of Southern California while working on Arlis II, Arctic Ocean. Depth 1170 m., 76°52'N, 178°10'E. Magnification approximately 22x.