

NORTHERN NEWS

Biological investigations at False River, Ungava Bay

During the months June to September 1958 the estuary of False River, Ungava Bay, was examined in the course of a study of the biology of the amphipods *Gammarus oceanicus* and *G. setosus* and the conditions of their shore environment. This work will be reported in detail when completed. The following is a general account of the area.

The estuary itself can be divided into three components: the seaward arm is a wide shallow area running generally southward to a group of islands and the major tributary stream on the east bank; then follows a narrow deep arm running to the southwest and opening finally into the striking expanse of mud and boulders known as Kohlmeister Lake. This becomes almost completely dry at low tide except for the small freshwater stream of False River proper.

Tidal currents were sufficiently strong to discourage more than one attempt at anchoring a canoe in mid-stream for measuring purposes. The water, which was turbid early in the season, cleared somewhat to give an extinction depth of 4 metres for an improvised Secchi disc. Mud and boulders are the dominant shore materials, and even where sand was found it was covered with a distinct layer of mud 1 to 3 centimetres deep, so that air trapped in the well-sorted underlying material issues in streams of bubbles under the pressure of the rising tide. This observation suggested that deposition of sediment takes place during spring and summer, followed by the resorting of finer materials during the storms of fall. An interesting feature of the shore is the pavement pattern in

which smaller boulders occur. Around rocks large enough to resist displacement by winter ice the smaller and somewhat rounded boulders are packed down to produce a generally uniform surface. This does not appear to be due to abrasion but rather to the pressure of ice that is hinged on the large boulders and moves up and down with the tides.

Sharp salinity and temperature fronts were observed moving up and down the estuary, and it seems that the central basin acts as a mixing reservoir receiving water from the north and south arms alternately. The following is a summary of temperature and salinity conditions in late July.

Stations	Salinity in %	Temperature in °C
Seaward parts	22 - 24	5 - 7
Mid-estuary	19 - 21	8 - 11
South Kohlmeister Lake	0 - 17	9 - 17

No evidence was found for deoxygenation in deeper waters; values obtained ranged from 7.1 to 8.1 ml. of oxygen per litre.

The rock of the surrounding country is of low monotonous relief presenting a smooth appearance when viewed toward the north in the apparent direction of ice movement, but at higher levels there are several instances of moraines and water-sorted deposits that suggest raised beaches.

Trees reach their definite limit along a line running northeast from the head of Kohlmeister Lake where there are some quite thick woods. Perhaps the most interesting aspect of the local flora is the extensive development of salt-marsh vegetation. Below the limit of

high neap tides the mud is covered during the summer with a rich green felt of filamentous algae to a depth of 1 centimetre. This striking association was described from the area by Blum and Wilce (*Rhodora* 60:283-8, 1958) who found it to contain two species of *Vaucheria* new to North America. On rocky parts of the shore this zone is dominated by *Fucus*. Between the limits of high neap and high spring tides, for a vertical distance of at least 9 feet, there is a strong development of salt grasses where soil exists; this association is particularly well developed in the extensive flats at the head of Kohlmeister Lake. The corresponding zone on the rocky parts of the shore is characterized by bare rocks or pools containing filamentous algae. At the extreme tidal limit there is a sharp line along which many species of plants are present, particularly wild rye and a silver-grey species of willow. Above this line, if trees are present, willows and swamp vegetation merge into a belt of tamarack. On the rocky shore there is an almost complete cover of black lichens.

During the summer only one lemming was seen, but evidence of much previous activity was noticed. Other mammals seen included three mice, one ermine, one silver-grey fox and a young black bear. Seals were occasionally seen throughout the length of the estuary, but the greatest concentrations occur about the seaward parts of False River.

Among the birds ptarmigan were particularly abundant in the vicinity of the base camp on the main eastern tributary of the estuary where two broods were kept under observation during July and until the formation of mixed coveys at the end of August. A family of black duck was reared in the immediate vicinity of the camp and became fully fledged in the first week of August. In contrast to the skerries of the river mouths, the estuary of False River supported few breeding sea ducks, but it did serve later in the season as an assembly point for large numbers of both ducks and Canada geese.

Of particular interest was the occurrence of frogs, tentatively identified as *Rana sylvatica*, in certain shallow pools

at the extreme upper limit of spring tides on the salt flats of Kohlmeister Lake. Adult frogs were seen in early July, but were not found later; tadpoles and young frogs, however, were still abundant in September when ice formed on the ponds at night. Large tadpoles kept in captivity at 9° to 14°C. metamorphosed in 6 weeks. These frogs living near the northern limit of their distribution in rather special circumstances would be excellent material for a detailed ecological study.

Some two hundred fish were measured and examined in detail by my companion Mr. P. M. Gillespie who found them generally and heavily infested by gut and body parasites, and during a trip to George River copepod gill parasites were found in 70 per cent of the arctic char. In this connection it was interesting to observe that up to 40 per cent of the two *Gammarus* species on which this work centred were infested with the intermediate stages of as yet undetermined intestinal parasites of vertebrates. A few specimens of *G. oceanicus* were found to contain a single huge, apparently neotenus cestode, which virtually filled the body cavity. *Gammarus* will be worth examining in any investigation of parasite problems of the many fish, seals, and birds that feed on it.

For several seasons the Department of Agriculture has worked in this region assessing the environmental conditions and the responses of a variety of domestic animals and plants. The department now has a sub-station on the southwestern shore of Kohlmeister Lake, and the writer wishes to acknowledge gratefully considerable help from Mr. R. I. Hamilton, officer in charge of the station. Thanks are also due to Mr. Hodgekinson, Northern Service Officer, and Mr. Ploughman of the Hudson's Bay Company, Fort Chimo. Substantial supplies were kindly donated for this journey by The Imperial Tobacco Company of Canada Ltd., C.I.L., Fry-Cadbury Ltd., and Nestlé's Ltd. The investigation was financed by grants from the Carnegie Arctic Research Fund and the Arctic Institute of North America.

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