

found also in this area. On the southern side of Telliaosilk Fiord they lay approximately 500 feet lower than at Kan-galaksiorvik Lakes.

The results of the two field seasons will be worked up and presented as Ph. D. thesis at McGill University in 1961.

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<sup>1</sup> Ives, J. D. Glacial geomorphology of the Torngat Mountains, northern Labrador. *Geo. Bull. No. 12:47-75. 1958.*

#### COMMENTS ON "CARNIVOROUS WALRUS AND SOME ARCTIC ZOONOSSES"

In this interesting paper (Arctic 13: 111-22) F. H. Fay suggests that polar bears and walrus contract trichinosis primarily from the flesh of ringed and bearded seals. I do not necessarily dispute this, but I do suggest that Fay unduly discounts other sources of infection.

Bears are omnivorous scavengers and at times will eat, or try to eat, the most unlikely substances. Armstrong<sup>1</sup> gives the stomach contents of a bear shot in Prince of Wales Strait as a few raisins, small pieces of pork fat, some tobacco leaves, and two pieces of common adhesive plaster. I have known them to chew into cans of engine oil. They walk long distances overland and along the shore and must frequently find carcasses of foxes, small mammals, and occasionally of other bears. That polar bears do not hesitate to eat the flesh of their own species is well known. Cases are mentioned by Edvard Bay<sup>2</sup> and by Stefansson<sup>3</sup>, and I have had caches of bear meat broken into and partly eaten by other bears. Occasionally cubs may be killed deliberately and eaten<sup>4,5</sup>.

In 1958-9 the Eskimos at Resolute reported that bears were eating trapped

foxes, and during the same season five out of 25 fox diaphragms examined were infected with *Trichinella*<sup>6</sup>. In 1949 on Prince Charles Island we saw places where bears had turned over stones, presumably in search of lemmings. (cf. Ref. 4, p. 110). When lemmings are really abundant it would be possible for a bear to obtain considerable numbers with very little effort. In the areas where ground squirrels are common it is not unlikely that these are also sometimes eaten. In the past when Eskimos abandoned their dead or gave them a very perfunctory burial, even humans may have been a source of infection.

Fay dismisses a bear — walrus — bear cycle as altogether untenable, for, he says, bears rarely eat walrus and there is no evidence that walrus ever eat bears. I do not wish to suggest that a bear — walrus — bear cycle is the main cause of trichinosis in either species, but it cannot at present be dismissed as an insignificant factor. Admittedly, direct evidence that walrus eat bear meat is lacking, but according to Fay (Table 1) only 201 walrus stomachs containing food have been examined, and the incidence of trichinosis in bears is so high that the eating of bear meat by walrus could be a most unusual occurrence and yet be an important factor in the cycle.

According to the Southampton Eskimos and my own observations, there is usually a live bear on Walrus Island and not infrequently one or two dead ones. The Eskimos consider that the latter die after having been wounded by walrus. Freuchen (Ref. 4, p. 109) also found a bear that had been killed by a walrus, and Giaever<sup>7</sup> gives a graphic though secondhand account of a herd of walrus killing a bear in the water. It is reasonable to suppose that pieces were eaten by those walrus that were carnivorously inclined. That walrus will eat large animals other than seals is attested by Pond Inlet Eskimos, who observed one feeding on a live Greenland shark<sup>8</sup>. On the other hand, if bears are attracted to Walrus Island by the walrus, it is probable that they occasionally succeed in killing one<sup>9</sup>. They also must frequently find walrus carcasses washed up on shore or floating

among the ice, as the thick hide of the walrus delays disintegration and escape of the gas that floats them. One instance was recorded in October 1937, when Southampton Eskimos found eight bears feeding on a single walrus carcass at East Bay.

In support of his hypothesis that seals are the main source of *Trichinella* infection in polar bears Fay observes that the frequency of infection in the Alaskan polar bear is twice that of those in Greenland where ringed seals are rarely infected. However, it is apparent from his Table 3 that only three infected ringed seals have been found: one in Greenland out of 1561 examined, and two in Alaska out of 300 examined. The difference in incidence is not significant ( $P=0.11$ ) at the 5 per cent level. Moreover, the same table shows that the infection rate for bearded seals is approximately equal in Greenland and Alaskan waters. On the other hand, the difference between the infection rate in the polar bear for the two areas is highly significant ( $P<0.001$ ), and in our present state of knowledge it seems more reasonable to suppose that this difference is caused by some item in the diet of the western bears than by an unexplained and possibly non-existent difference in the incidence of trichinosis in seals.

Since the original draft of these comments was submitted to the Editor I have had the advantage of considerable correspondence with Dr. Fay. As a result some parts of my note have been amplified and documented. Fay has drawn my attention to his reservations regarding Table 1 and has pointed out that the same reservations apply to the other tables. These tables cannot therefore be considered random samples of populations, and thus no firm conclusions can be drawn from them. This applies to both bears and seals, and the apparent differences in the incidence of trichinosis in Alaska and Greenland animals may be the result of differences in the average age of the samples. However, in the case of the bears the bias would have to be large. Perhaps, as Fay suggests, I have read more definite conclusions into his hypotheses than he intended. Cer-

tainly my own comments and suggestions are extremely tentative. Moreover, I have little doubt that seals are an important source of infection in bears; only further work can tell if they are the most important source. One point on which I am sure we both agree is the need for more comprehensive studies on the food habits of bears and other northern animals. Most of the references given here are vague and have little quantitative value. It is also obvious that records of *Trichinella* infection in animals now known to be susceptible are of small value unless full data, including age, sex, and negative as well as positive observations are recorded and published.

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<sup>1</sup> Armstrong, A. 1857. A personal narrative of the discovery of the North-West Passage. London: Hurst and Blackett. p. 330.

<sup>2</sup> Sverdrup, Otto. 1904. New Land. London: Longmans, Green. Vol. 1, p. 444, 451.

<sup>3</sup> Stefansson, V. 1921. The friendly Arctic. New York: Macmillan Co., p. 479.

<sup>4</sup> Freuchen, P. 1935. Rept. Fifth Thule Exped. Copenhagen: Gyldendal. Vol. 2, pt. 2, p. 111.

<sup>5</sup> Van de Velde, F. 1957. Eskimo 45:7.

<sup>6</sup> Choquette, L. P. E., and A. H. Macpherson, personal communication.

<sup>7</sup> Giaever, J. 1958. In the land of the musk-ox. London: Jarrolds, p. 102.

<sup>8</sup> Johnson, Cpl. J. R., R.C.M.P. Game conditions. In Ann. Rept. 1957-8. Ottawa: Can. Wildl. Service files.

<sup>9</sup> Loughrey, A. G. 1959. Preliminary investigation of the Atlantic walrus, *Odobenus rosmarus* L. Wildl. Mgnt. Bull. Ser. 1, No. 14, p. 52-4.

#### SUMMER SCHOOL COURSE IN ESKIMO LANGUAGE AND CULTURE AT THE UNIVERSITY OF ALBERTA

A course in "Eskimo Language and Culture" will be offered in the 1961 Summer School of Linguistics, which is being conducted under the joint sponsorship of the University of Alberta and the Canadian Linguistic Association from July 3 to August 15 on the campus of the University in Edmonton, Alta.