lis L., and a *Pedicularis* sp. (not acknowledged by Simmons from this area, although he includes a doubtful collection under the Bessels Bay area), while the assignment of *Taraxacum palustre* DC. is in doubt. The record of *Ranunculus nivalis* var. is doubtful, although it has been recorded from the east coast of Ellesmere Island. It is probably a specimen of *R. sulphureus* Sol. which has been recorded elsewhere in northern Greenland. Polunin[9] doubted the report of *Dupontia fisheri* from this area, however the recent finding of this species by Brassard and Beschel[8] at a similar latitude on the west coast of Ellesmere Island further supports this record. Bessels[5] recorded the presence of *Carex dioica* L., which is usually considered as a synonym of *C. gynocrates* Wormskj., but the known distribution of this species in Greenland casts doubt on the identification of Bessels' specimen, as was indicated by Simmons[4], Porsild[10] and Polunin[9]. Hart[6] includes a further *Draba* (*D. hirta* L.), *Melandrium* (*Lychnis*) *affine* (J. Vahl) Hartm., *Saxifraga caespitosa* L., *Luzula confusa* Lindebl. (*L. campestris* Sm.), *Festuca brachyphylla* (*F. ovina* L. var. *brevifolia* (R. Br.) Hart), and *Taraxacum Dens-leonis* Desf. (probably *T. phymatocarpum* J. Vahl). He also records *Potentilla frigida* Vill. and *Poa flexuosa* Wahl., but without the specimens it is difficult to assign these even tentatively. Ruling out any species for which the identification is in doubt, we can add 13 species from the lists of Bessels and Hart, giving a combined total of 50 species for the Polaris Bay area. This total is poor in number of species when compared with other areas of the High Arctic [1,8,11]. Additional collecting will undoubtedly add other species, especially if habitats occurring at higher altitudes on Polaris Promontory, or further inland are included.

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Winter Predation of *Mustela Erminea* in Northern Canada

Weasels are the most widely distributed mammalian predators in North America.[1] This paper reports the results of a study of short-tail weasel predation in northern Alberta and the Northwest Territories during the winter of 1964-65.

TABLE 1. Classes of material in 126 stomachs of *Mustela erminea* trapped in the winter of 1964-65.

	FORT PROVIDENCE (n=92)		GRANDE PRAIRIE (n=34)	
	Frequency of Occurrence	% Occurrence	Frequency of Occurrence	% Occurrence
Mammal	51	55	22	66
Fish	12	13	0	0
Amphibian	6	7	0	0
Bird	4	4	2	6
Insect	4	4	2	6
Vegetable	13	14	5	15
Empty stomach	26	28	3	9

TABLE 2. Mammalian prey from 126 stomachs of *Mustela erminea* trapped in winter of 1964-65.

	FORT PROVIDENCE (n=92)		GRANDE PRAIRIE (n=34)	
	Frequency of Occurrence	% Occurrence	Frequency of Occurrence	% Occurrence
Zapus hudsonius	17	18	10	30
Peromyscus maniculatus	15	16	6	18
Microtus pennsylvanicus	6	7	4	12
Clethrionomys gapperi	6	7	0	0
Lemmus trimucronatus	2	2	0	0
Sorex vagrans	0	0	1	3
Unidentified mammal	5	5	1	3

MATERIALS AND METHODS

Information was obtained by studying the stomach contents of 126 weasels; 92 from the Fort Providence area of the Northwest Territories and 34 from Grande Prairie, Alberta. All carcasses were received through the co-operation of local trappers.

Carcasses were frozen until autopsied, and thereafter the stomachs were preserved in 10 per cent formalin. When the stomachs were opened the hairs, feathers and all hard parts such as bone fragments, teeth, and plant material were saved for identification. Hairs were identified by comparison with a reference collection of whole mounts of known hairs, and by comparing impressions of the cuticular scale patterns of the hairs from the stomachs with those of known hairs.[2]

The relative densities of the prey species were determined from the work by Fuller *et al.*[3,4] in the same area and in the same period of time, and also from my own field studies in the summer prior to my winter work.

The results of this study are shown in Tables 1 and 2.

DISCUSSION

The potential prey species of the weasel in the study areas are:

Peromyscus maniculatus
Clethrionomys gapperi
Clethrionomys rutilus
Microtus pennsylvanicus
Phenacomys intermedius
Synaptomys borealis
Zapus hudsonius
Lemmus trimucronatus
Sorex cinereus
Sorex palustris
Sorex vagrans
Sorex arcticus
Microsorex hoyi
Tamiasciurus hudsonicus
Eutamias minimus
Mustela rixosa

The position of *Zapus* as the most frequent winter prey species was unexpected in view of its low numbers in both study areas. One or two individuals were taken around Fort Providence in 5 years of trapping[3] and one was secured during my 1964 and 1965 summer field work in the area. *Zapus* is possibly more abundant in the Grande Prairie area since it is not at the limits of its range, but in relation to other small mammal species it would still be low in numbers.

Equally interesting is the third ranking frequency of *Microtus*. Fuller[3] found the numbers of *Microtus* trapped in the period 1964-67 in the Fort Providence area to be very low. In fact, the total number of *Microtus* and *Zapus* taken during these 4 summers of trapping represents just over 1 per cent of the total number of small mammals autopsied during this time. Of the small mammals collected by Fuller[3] in the summer of 1964, approximately 65 per cent were *Peromyscus*, 5 per cent *C. gapperi*, and *Microtus* and *Zapus* together represented 4 per cent. This gives some indication of the relative abundance of those 4 species in the summer preceding the winter of my study.

During several years of tracking weasels I have observed that the weasel spends much of its time in the subnivean environment during the colder periods of the winter. This would indicate that weasels could easily find the hibernaculae of *Zapus*. Kraft[5] states that the weasel lives under the snow when the air temperature falls lower than $-13°$ C. During the period of my study in the Fort Providence area the mean maximum and the mean minimum air temperatures recorded at the Heart Lake Laboratory of the University of Alberta (69 miles southeast of Fort Providence) were $-15°$ C. and $-23°$C.

Aldous and Manweiler[6] found *Zapus* represented 1 per cent of the small mammals snap-trapped, but they claimed that because of its hibernating habit it did not appear in the winter food eaten by weasels. These authors give no indication of the status of the population of the primary prey species and, therefore, no indication of the pressure on secondary prey species such as *Zapus*.

Quimby[7] presents data which indicated that considerable obesity precedes hibernation in *Zapus*, individuals at the beginning of hibernation weighing more than twice as much as individuals not yet hibernating. This is a large weight difference for such small mammals. The fat, hibernating *Zapus* would thus become a valuable and significant food source for the weasel.

Jackson[8] states that mice comprise approximately 50 per cent of the weasels' food in summer; more in winter. He also lists bird (5 per cent), frog, snake and fish (occasionally) and shrews (especially in winter) as occurring in a weasel's diet. Kraft[5] also says that weasels feed largely on shrews (and vegetation) during long periods in mid-winter when they remain under the snow. Quick[1] reports a "notable quantity of insects" in the diet of weasels.

None of the other investigators of weasel feeding habits has commented on the combinations of food items found in weasel stomachs. I found that in stomachs which contained much mammal material there was usually no other class of material present. Stomachs which contained little mammal material normally contained vegetation plus one or more of the other classes of animal material. In the latter case, no correlation of combination was evident.

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