

for the commercial value of their hides, for skins and for meat by whalers wintering along the Arctic coast east of the Mackenzie River delta. On the Arctic islands similar heavy killing is recorded. The population on Banks Island was exterminated by natives before 1870 and, in the name of exploration, hundreds of animals were killed on Melville and Ellesmere Islands early in the present century. By 1930 the total population of musk-oxen in Canada was estimated by Dr. R. M. Anderson of the National Museum of Canada to be between 12,000 and 13,000 animals, of which 500 were on the mainland. That estimate is now believed to have been too high.

The extermination of many herds and the near elimination of many others, particularly on the Canadian Arctic mainland, in the second half of the 19th century and during the first fifteen years of the 20th century, created grave concern for the survival of the musk-ox. To conservationists it was unthinkable that a large ungulate, well adapted to living in a rigorous Arctic environment, should become extinct. The Canadian Government therefore passed an Act in 1917 protecting musk-oxen completely and in 1927 set aside the Thelon Game Sanctuary in the Northwest Territories to provide an area where musk-oxen and other valuable wildlife could increase without human interference.

Today musk-oxen are increasing steadily, if slowly, in numbers and are being reported in areas such as Banks Island and the area north of Great Bear Lake, where formerly they were believed to have been exterminated. The population in the Thelon Game Sanctuary is estimated to be over 350 animals. The total population in Canada is estimated at about 5,000 animals, of which 1,500 are thought to be on the Arctic mainland and 3,500 on the Arctic islands.

Musk-oxen are essentially gregarious, feeding and travelling in herds which vary in size from units of four or five animals to as many as one hundred. Herds exist throughout the year but probably do not contain the same individuals from year to year because the herds mingle in the autumn after the breeding season and disperse later into smaller units. When grazing or browsing, the individuals of a herd may be spread over an area of several hundred square yards but the herd unity is not lost because the wanderers rejoin the herd as soon as they notice their exposed situation. Mature bulls are frequently solitary in their habits, particularly immediately before and after the breeding season.

This desire to remain in herd formation appears to be an outstanding characteristic of the animals. The value and perhaps the original function of that social character is evident when a herd is attacked by wolves. The musk-oxen group together in a rough circle, facing outwards, with calves and immature animals between the adults. One wolf or a small pack would not be likely to attack successfully such a defensive formation. The sharp, heavy horns of adult cows and bulls, their heavy coat of long hair, nimble feet and powerful bodies make them formidable opponents. When sled dogs or possibly a large pack of wolves attack musk-oxen, bulls and adult cows make short dashes towards the predators in attempts to gore them, and then back into the herd. Under such circumstances it is possible that some musk-oxen are killed by their attackers.

The food of musk-oxen varies with the season and the terrain. In summer, on the Canadian Arctic mainland, the animals are browsers and grazers, feeding on willow, grasses, forbs and sedges. On the Arctic islands where willow growth is confined to prostrate plants sparsely scattered over large regions, musk-oxen must use a larger proportion of grasses and plants such as saxifrage (*Saxifraga oppositifolia* L.) and dryas (*Dryas integrifolia* M. Vahl.). Winter food is obtained in hilly country where vegetation is kept partly or completely free of snow by prevailing winds. Willow, birch, labrador tea and other woody plants form the bulk of food in winter. The extent of the seasonal movements between winter and summer ranges depends upon the nature of the country in which the animals live. In the