The Affectionate Walrus

Many different species of very young seal and sea lion pups are extremely friendly to man after they overcome their initial fear upon being captured. Sometimes this will require a matter of days but in other species, such as a few-days-old Steller sea lion pup, they will have lost all sense of fear within the first fifteen minutes after their capture. I have sat down cross-legged on the snow three feet in front of a Weddell seal cow and her pup to get some very close-up pictures and when the moving camera started the pup came forward and rested its head on my knee and watched. After five minutes of taking pictures, I got up and walked away and the cow never raised her head up off the snow. One might explain this on the basis of extremely little contact with man on the part of the Weddell seal in the Antarctic. But the walrus which has been hunted by the Eskimos for many years is the most naturally affectionate of all marine mammals.

They weigh about one hundred and twenty pounds at birth and show almost no fear of man even up to a year of age in the wild. Very young walrus can be easily trained to nurse a special formula from a bottle and they require about a gallon of formula per day. In order to make their formula compare favourably with their mother's milk, a gallon of formula requires three quarts of whipping cream with one pound of clam meat plus salt, minerals, and vitamins homogenized in it. As one would expect, they will gain as much as 12 pounds or more per week on such a diet.

Whereas the Weddell seal pup may rest its head upon your knee, the walrus is not satisfied unless it can climb all over you even after he gets up to fifteen hundred pounds or more.

It therefore soon becomes unsafe to get into a pool with them because of the danger of being drowned, and out of water one may be pinned down so as to require help to get up, particularly if there is more than one walrus. If anyone sits down where there are two or three young walrus being raised by hand, they will all try to climb upon you at the same time.

In the case of most marine mammals if any object such as a hydrophone is placed in their pool they completely ignore it, but the walrus is there almost immediately and has it in his mouth or is playing with it in his flippers. It is therefore difficult to obtain underwater recordings of them unless the hydrophone is placed in some inaccessible place. Even placing dummy hydrophones in the tank for a week ahead of time helps very little if they see the new hydrophone go in.

If one throws a half gallon nursing bottle half full of formula into their pool, they will occasionally pick it up in their flippers, lie on their back and nurse from the bottle while holding it up over them with their flippers. Their baby-like whimper and low-pitch woof! woof! and their apparent desire for physical contact with human beings make them one of the most attractive of the marine mammals.

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The Geographical Position of the North Water

The name "North Water" was coined by the whalers in the last century to describe an area of open water that they almost invariably found at the head of Baffin Bay early in the season. It was the reward that made it worth while to batter their way, at considerable risk, up the Greenland coast and through the ice of Melville Bay as early as May or early June. If they were lucky they then had clear sailing to Lancaster Sound and Pond Inlet, if unlucky they ran into the "West Ice" on the west side of Baffin Bay, but in either case they were in whale country early in the season. The feature is still well known and the subject of much attention, but there is a regrettable tendency to corrupt the simple and effective historic name to the redundant form "North Open Water". May I therefore preface this note with a plea for the preservation of the original name.

The open water was also well known to the Eskimos of the Thule and Etah districts in Smith Sound and later to the Danes who founded the first trading settlement in northern Greenland at Thule. But whereas the whalers knew it only in spring, to the Greenlanders it was a winter phenomenon which restricted sledge travel but provided splendid hunting conditions, as the open water is a refuge for all kinds of marine mammals. Thus it is not surprising that past accounts have presented considerable variation and apparent disagreement in the actual position of the feature, positions given varying from the area east of Lancaster Sound to the head of Smith Sound. That this was due simply to observations being made at different places and different times of year has long been suspected by those attempting to synthesize the available data, and this fact is now con-

firmed by air reconnaissance and satellite observations.

Fig. 1 represents an attempt to trace the development of mean conditions for the months March to June from data for the years 1954 to 1968.

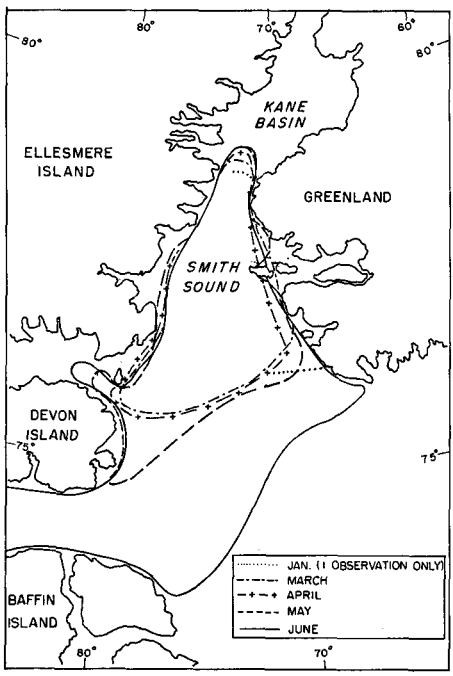

FIG. 1. Mean monthly extent of the North Water.

The source material consists largely of the reconnaissance flights of the U.S. Naval Oceanographic Office (earlier Hydrographic Office), which has carried out annual reconnaissance since the early 1950's. Also included are data from flights by the Canadian Meteorological Service for the years 1960-65 inclusive and my personal observations made on flights in May of the years 1960, 1961 and 1962. For the 1966 to 1968 data satellite pictures have been used, but owing to light conditions they are not available before April, and for 1966 there are none until May. Observations are almost completely lacking for the months from October to February, and in the summer the North Water ceases to be distinguishable as an ice phenomenon, as will be discussed later.

The reconnaissance flights are not made at regular intervals and there are some gaps in the data. Thus for any given month the number of available ice charts varies from 0 to 4, with most falling in the 1 to 3 range, and in many cases visibility conditions or flight track limits the coverage of the observations. The satellite data too are often restricted by cloud cover; although a picture is obtained almost every day very few of them show all the required area clearly. Thus the resulting "means" in Fig. 1, which are averaged by eye from the plotted data for each year in the series, should not be regarded as more than a rough approximation. Only actual observation data have been used. Estimated data, which in earlier years were included on many Hydrographic Office ice charts, have not been included.

Despite the incompleteness of the data, a number of points emerge very strongly. First and by far the most striking is the extreme stability of the north limit of the North Water, which consists of a fast-ice bridge forming a convex curve across the narrow head of Smith Sound. This feature is almost completely constant and persists up to late July or August, when a general break-up occurs in Kane Basin. There is a suggestion that at times a lead may develop along the southeast coast of Kane Basin about the beginning of June, but how frequent this is and whether it joins up with the North Water is not certain, owing to the difficulty of distinguishing open water from the ice-free land in this area, which for some reason appears unusually dark in the satellite pictures. Such a lead appears only rarely on the visual reconnaissance charts and it is therefore not included in the map.

The satellite pictures also show an extremely constant fast ice edge throughout each season down the Ellesmere Coast and only minor differences in it between the seasons. Some open water along both Ellesmere and Greenland coasts is apparent in all pictures, with an especially unvarying open patch in the entrance to Jones Sound. A lead down the east coast of Devon Island, often extending far along the south coast, is also nearly always present, as is a lead across Lancaster Sound from the vicinity of Maxwell Bay to the northeast corner of Somerset Island. Naturally from three years of observation it is not possible to say that these are unvarying features, but they must at least be of fairly frequent occurrence.

In 1969 the Lancaster Sound lead actually appears farther west, at the northwest corner of Somerset Island (Fig. 2). There are, however, indications in this picture that the 1969 season may be unusually advanced, the most striking of these being the amount of open water in Foxe Basin and the dark grey tone of the ice here and in Hudson Bay and Strait.

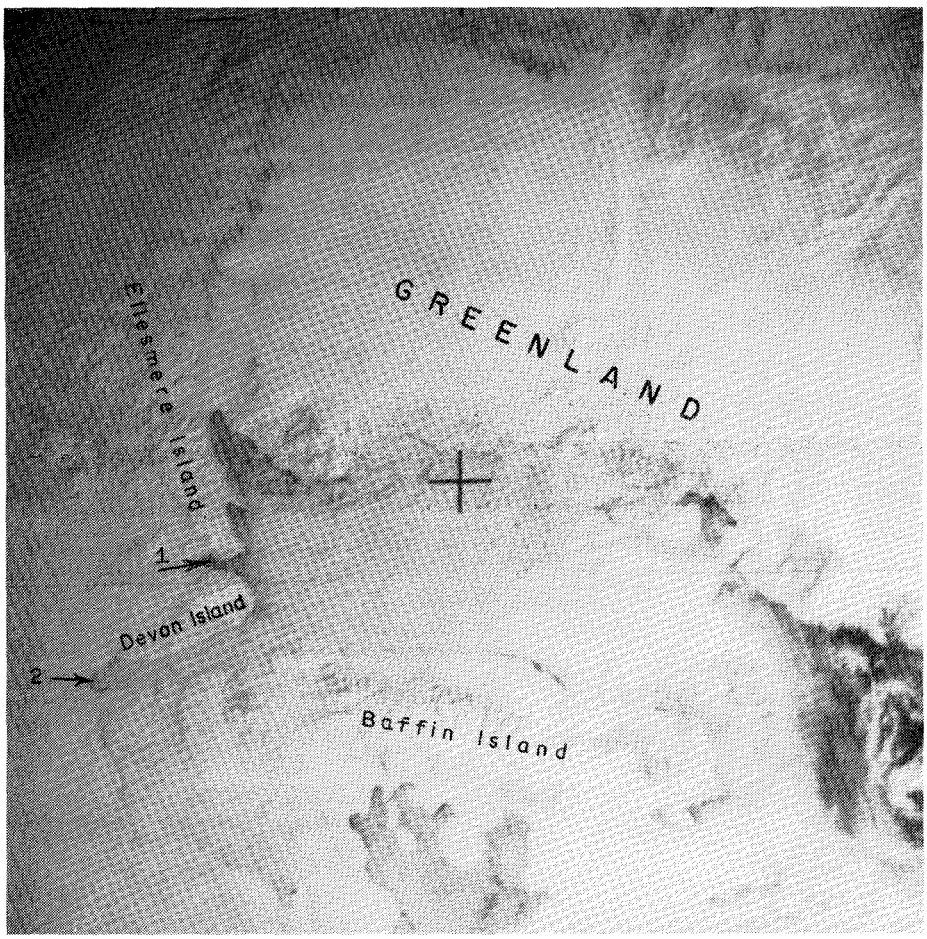

FIG. 2. APT picture received by the Meteorological Service of Canada from ESSA 8, 5 April 1969. Shows the North Water with its extension into Jones Sound (arrow 1) and the lead across Lancaster Sound (arrow 2).

The open water at the entrance to Jones Sound is also further developed than is usual at this time of year.

The southern boundary of the North Water, by contrast, is extremely variable and often ill-defined. The lack of definition is due to the fact that, through the late winter months at least, the North Water is not really open, or at least only in limited parts, usually confined to the extreme north of its area. For the rest it may contain anything up to 9/10 concentration of ice, but the greater part of it will be young ice. Towards the south the concentration and age tend to increase gradually, so that it is not always possible to draw an exact southern boundary.

The variability of the southern boundary is of course climatic and seasonal. The coincidence of the lines for March and April on Fig. 1 suggests a stability for these months, and the solitary observation for January gives a slight indication that this stability might persist throughout the winter. However this possibility should be regarded with caution. The charts for individual years show as much variation from year to year for March and April as for May and June.

The spread south usually seems to start in May but may be delayed till well on in June, and proceeds, at varying speeds but in the pattern illustrated, down the west side of Baffin Bay. The Jones Sound tongue does not spread very noticeably, but the Lancaster Sound one usually extends right to the Somerset Island lead (off the map in Fig. 1). On the Greenland side of the bay the open water

spreads more slowly but occasionally a tongue of water opens into Melville Bay. Once the southward spread is well established the proportion of truly open water tends to become higher and the southern boundary easier to identify.

The northern ice bridge usually breaks up in late July or August. The satellite pictures show the date fairly clearly as early August in 1966 and mid-August in 1967. Once the bridge has gone it becomes impossible to define the North Water at all from ice observations, as the area becomes merely part of the southward drift route, or melting ground, for ice from Kane Basin and farther north. Unfortunately observations are lacking for the freeze-up period, so the date of formation of the bridge and the extent of the North Water through the dark months can only be guessed at. It is reasonable to suppose that the bridge would form at the time Kane Basin freezes over, probably in October, and that the North Water is present from that time on. It should be possible to confirm this as soon as infrared imagery of sufficient definition is available from satellites.

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A Forest Ecosystem on a Glacier in Alaska

INTRODUCTION

Russell[1] noted that alder, cottonwood, and spruce were growing on the Malaspina and nearby glaciers in the vicinity of Yakutat. Several papers in the 1890's and early 1900's note the occurrence of vegetation on glaciers, but the emphasis was on geological, especially glacial features. Significant published ecological observations of this important phenomenon have not been found.

Russell[2] describes the forest on the Malaspina Glacier as follows:

> The forest covering the greater portion of the lowlands extends up over the moraine-covered bluff of ice and thence inland on the surface of the glacier for 4 or 5 miles... On account of the melting of the ice, the debris and vegetation on the steeper slopes frequently slip down in small landslides, forming a chaotic accumulation of bowlders and uprooted trees.
>
> The debris on the surface of the escarpment, and covering the glacier to the north, is not of great thickness. Many of the bowlders are 8 or 10 feet in diameter, but when these are not present the layer of earth and stones which conceals the ice and forms the stratum on which vegetation has taken root, is, on an average, not more than 3 or 4 feet thick, and is frequently much less.
>
> The vegetation through which we cut a trail consisted principally of alders, growing to a height of 20 or 30 feet, but on the outer or older portion of the moraine there are dense groves of spruces, some of which are 3 feet in diameter. The spruce trees decrease in number and become of smaller size toward the interior.

In October 1968, I made a brief visit to the Kushtaka Glacier and a forest ecosystem that occurs on it; my observations follow.

THE KUSHTAKA GLACIER

The Kushtaka Glacier is a branch of the Martin River Glacier about 60 miles east-southeast of Cordova (Fig. 1). The Martin River Glacier is fed by the Bagley Ice Field

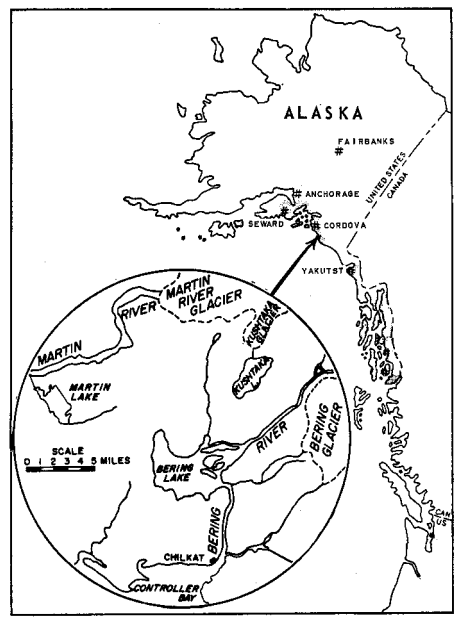

FIG. 1. Location of the study area.

in the Chugach Mountains. The snout of the glacier extends down to about 100 feet elevation. The vegetated portion of the Kushtaka Glacier is stagnant with many craters (Fig. 2).

VEGETATION

Succession on top of the glacier is very similar to, perhaps identical with, that on many tills left by the receding Mendenhall and Herbert Glaciers near Juneau[3]. After the raw soil surface is somewhat stabilized by