

whereas there are far more differences than similarities, just as the Russian-Alaskan navigational areas are as different from those of mid-Canada as the eastern Arctic is from the latter.

In dealing with icebreaker operations, Captain MacDonald covers every phase with authority and first-hand knowledge but leaves the impression that polar voyages can only be conducted successfully with the aid of icebreaker escort. This is anything but the fact as almost all marine operations in the western Arctic are unescorted and have been for some time. With proper aerial reconnaissance and weather reports any well found ship should be capable of carrying out a successful voyage almost anywhere in ice navigable waters as time is generally not the essence.

The main interest and activities of the author were in the Antarctic and it is too bad that he did not concentrate on the one polar area. For instance: any type of cargo aircraft *can* land on one year ice in the Arctic, even the largest craft (p. 12). While the Arctic polar basin may have moving ice all year, this is certainly not the case in areas used for navigation. The Canadian Arctic Archipelago is composed of almost completely land-fast ice during the winter as is the mainland coast (p. 13). Present icebreakers do not guarantee scheduled service through the Northwest Passage as even icebreakers have been beset or disabled and will continue to be. Small vessels have made the Passage as Captain MacDonald states but did not take "at least a couple of years" due to ice conditions, but because the expeditions had other purposes to accomplish first. Amundsen took 4 and Larsen 3 years; but when it became the prime mission for the latter, he did make the Passage in one year (1944). Prince Regent Inlet is of little consequence in making the southern Passage as it is only used by way of Bellot Strait, as a short cut: Peel Sound is a much better ice-free route (p. 20). Page 128 covers the use of bay ice to unload cargoes. However, while this is true of the Antarctic, there is no bay ice in the summer in the Arctic except in the areas that shipping has not yet reached.

Living off the land is suggested on p. 170. This is a concept far easier to visualize than to effect, as one must assume two circumstances rarely occurring simultaneously in the Arctic: (a) that game is available; (b) that the survivor in an expert hunter. The present concept is to make sure that survival rations are available; a maximum intake of fluids, and rest until rescued. The suggested survival kit on p. 163 could be greatly im-

proved. Methyl hydrate alcohol for starting the primus stove and cleaning picks, a *must*, should be included. An ordinary hand saw is much more efficient for cutting snow blocks than a knife and requires no expertise. Ice chisels would be very much more useful than ice axes.

Two points that Captain MacDonald makes are the most important to me: "Obviously, it would be better never to get into such predicaments" (p. 60, besetment in ice) and "Remember, also, that some ice can never be budged by any icebreaker in the world, and the forces of nature, wind, and current can move more ice in a few hours than an icebreaker can in a lifetime" (p. 67).

In spite of isolated criticisms, I heartily endorse this text of icebreaking operations in the polar areas and am much impressed by the painstaking research involved in producing the only publication of its kind.

Scott E. Alexander

POPULATION ESTIMATES OF BARREN-GROUND CARIBOU, MARCH TO MAY 1967. BY DONALD C. THOMAS. *Canadian Wildlife Service Report Series, Number 9. Ottawa: Department of Indian Affairs and Northern Development, 1969. 8½ x 11 inches, 40 pages, 13 figures, 25 tables. \$1.00.*

This is a welcome contribution to knowledge of the improved population status of the barren-ground caribou in Canada after the drastic herd reductions of the 1950's. Donald Thomas, in this short, but very detailed report, has provided information on late winter distribution, spring migration routes and total population numbers of caribou in the Mackenzie District and adjacent portions of Alberta and Saskatchewan. Based almost exclusively on aerial surveys conducted during March and May 1967, the study also provides information on effectiveness of comparative census methods, recruitment rates, human utilization, and predation by wolves.

Thomas estimated that 322,500 caribou existed in the census area and, with other caribou wintering east of 102°W., the total number of barren-ground caribou on the mainland of Canada in 1967 was 387,000. This represents a 7.6 per cent average annual rate of increase from the 200,000 estimated by Kelsall in 1957-58. Recruitment in the survey region was found to be 11.0 per cent, however, when related to mortality statistics the rate of increase in 1966-67 was 2 per cent. Although hunting of caribou is still important to the native people living in the study area, total harvests have decreased

substantially in the past decade due to changing ways of life; the estimated annual hunter kill was 12,500 or 4 per cent of the population. A total of 94 wolves was sighted during the aerial survey work; however, these were concentrated in the area of the Bathurst No. 1 herd which was located east of Great Bear Lake. It was estimated that at least 200 wolves were in the vicinity of this herd of 93,000.

Four methods were used to obtain estimates of caribou numbers in the major herds: 1) a total count, 2) a strip census, 3) aerial photography, and 4) a ratio method to account for missed sex and age components. There is considerable discussion of each of the methods employed and justification for their use. This should be of value to others undertaking population counts of caribou. One of the major criticisms of the report, however, is that there is no adequate basis presented for evaluation of the reliability of the various methods used and in addition, final herd estimates are often adjusted on a subjective basis to account for missed animals. This raises the question of the reliability of the final estimates of herd size. For example on page 23 the author assumed that 20 per cent of the caribou in a timbered area of a strip census were not seen by the observers. His reference to surveys conducted under different conditions and reported by other authors does not seem to be adequate justification for selecting the 20 per cent value. Similar estimates of numbers of caribou that were outside of areas of the census appear equally speculative. On page 29, the Bathurst No. 3 herd, which was not included in the census, is estimated at 25,000 to 30,000 on the logic that this herd was composed almost exclusively of adult bulls assumed to be missing from herds 1 and 2.

It is encouraging that the Canadian Wildlife Service is continuing to make available, through their Report Series of publications, research information on wildlife species. The high quality of the map and figure reproductions in these publications is particularly noteworthy. The liberal use of maps to show distribution and movements of caribou and census routes in Thomas' report add considerable clarity to the presentation. In fact, the lengthy discussion on late winter distribution and spring migration routes appears unnecessary in view of the effective use of the maps. Other excessive detail throughout the report, for example in the narrative of the census procedure, while appropriate for an "in house" administrative report, seems unessential to the published report.

David R. Klein

**THE SEVENTH CONTINENT: A WOMAN'S JOURNEY TO ANTARCTICA.** By DAPHNE MACHIN GOODALL. *Royston, Hertfordshire, England: The Priory Press Ltd., 1969. 7 x 10 inches, 74 pages; colour, black and white illustrations. 42s.*

For the last few years 'Animals' magazine has been organising 'package tours' to Antarctica for members of the public with £1,500 to spare. Party members are supposed to have some basic interest in wildlife — to look at which is the primary purpose of the trip — but this may be of the slenderest: a mere membership of a natural history society.

Daphne Machin Goodall was one of the lucky 61 who paid out their money in January 1967 and this book is the story of the trip as she saw it. The title is misleading, the text making no pretence to be about "The Seventh Continent". There are 74 pages to the book, 8 of them blank and many more partly so. Not until p. 31 is the party setting sail from the South American mainland for Tierra del Fuego and arrival in Antarctica is not until p. 53. Chapter VII (five and a half pages in all) is about the party's experiences on the edge of the Grahamland Peninsula and their brief dip south of the Antarctic Circle, then, after a cursory look at modern antarctic research teams, the reader finds himself on the way North again.

The author was favourably impressed by the icecaps, but not by the personnel, who are described as "A typically masculine organised community . . . guilty of appalling untidiness".

Some of the photographs are excellent; others less so. One of two giant petrel chicks, the tubular nostrils plainly visible on their massive beaks, is entitled "Giant Skuas"! On the page opposite to this we read that the exclusively ocean-feeding black-browed albatrosses are "quite shamelessly taking penguins' eggs"!

This, unfortunately, is the general standard of the natural history information throughout, and one wonders that the publishers did not get a natural history reader to check on obvious spelling errors such as "zooplankton", "protoza", "fulmer", "guanacho" and "ornothologist"; to change those mysterious "antipods" on which the krill are said to feed, into something more edible and to point out that the first reptiles did *not* evolve during the Cambrian period.

The author has no conception of the meaning of the term 'baleen or whalebone whale' — listing these among a number of others, most of which *are* baleen whales. Nor does