ANTARCTIC OCEANOLOGY I. EDITED BY JOSEPH L. REID. *Antarctic Research Series, Volume 15. Washington: American Geophysical Union of the National Academy of Sciences — National Research Council, 1971. 8 x 10¾ inches, 343 pages. $22.00.*

The Antarctic Research Series maintains a very high standard of excellence and usefulness, and this 15th volume in the Series is something of a milestone in Antarctic marine research. In terms of the past history and present climate of the world, the fact that Antarctica is a polar continent entirely surrounded by the sea is even more significant than that the Arctic Ocean is a polar sea largely surrounded by land. Glaciations begin in the Antarctic, and the effects of the circumglobal Antarctic Ocean are felt northward to the Caribbean and the gates of the Mediterranean. The antarctic waters in fact fill most of the deep ocean basins of the world, and round the antarctic continent itself they are among the most productive marine regions in terms of living resources. Research in these rich waters began early in the present century, pioneered by British oceanographers. Many nations are now engaged in the work, and the Antarctic Research Series forms the chief publication outlet for the United States' contribution.

The present volume covers a fairly wide spectrum of oceanography (or oceanology, as the title has it; the difference between the two is at the verbal level only), including general physical oceanography, marine paleontology, geology and geochemistry, and there is one short paper on living populations. It is therefore not easy, perhaps impossible, to review it in detail, but it may be said for a start that all thirteen of the papers are important contributions in their several fields. The paleoclimatic paper by Bandy, Casey and Wright has a particular fascination for the non-specialist (your reviewer, for example); it is an important addition to the long list of papers in the guide to past climates, and appears to confirm the existence of glaciation in the late Miocene, some four million years ago, but it dates the onset of the definitive Pleistocene glaciation at only one million years ago. In the light of other work in this field, it is clear it will be some time before the pattern of the Pliocene-Pleistocene climatic changes settles into a generally accepted form.

Arnold Gordon's remark that the Arctic Ocean is usually recognised to be a "marginal sea of the Atlantic" may stir partisan resentment, and it does not fit with other expert opinion, which holds that the Arctic is an ocean in its own geophysical right, and perhaps much older than the Atlantic. His paper on Antarctic oceanography is a general, up-to-date statement of the water structure and meridional circulation of the Atlantic and Pacific sectors; it is a valuable addition to the work of others, notably British and Russian scientists, and analyses a very large body of new measurements made by the U.S. teams. The water mass analysis by temperature-salinity plotting is particularly interesting; so is the discussion of the occurrence and distribution of super-cooled water and its origin, and the study of meridional transport fills an obvious need in antarctic oceanography. There are also some interesting speculations on paleoceanography and the climatic effects of a glaciated and a non-glaciated Antarctica.

The geophysics of the sea floor are served by three papers from the Lamont-Doherty Geological Observatory of Columbia University, and the volume closes with papers on geological and chemical matters of the sediments. This is a book for specialists, and the specialists involved will certainly be looking forward to the next volume on Antarctic Oceanology in this series.

*M. J. Dunbar*

ARCTIC FEVER: THE SEARCH FOR THE NORTHWEST PASSAGE. BY DOUG WILKINSON. *Toronto: Clarke, Irwin & Company Limited, 1971. 6 x 8¾ inches, 154 pages, illustrated. $6.50.*

The more I read of Doug Wilkinson's *Arctic Fever: The Search for the Northwest Passage* the madder I got for there was little I could find to criticize, to carp about, to nit pick or to put down.

Who better to write about "Arctic Fever" than one who is so sorely afflicted with that disease, one who knows intimately the locale about which he writes and one who has taken the trouble to do some homework before he took pen in hand.

The new interest in the resources of the North American Arctic and the routes leading to and from them has generated a spate of books and articles about this part of the world, many of them sired, unfortunately, by the instant expert.

The author of "Arctic Fever", while producing an eminently readable book, has told his story honestly. Where differences occur in source material he has acknowledged these differences. Where there are doubts they are stated. For example: "When I write about John Franklin, I am troubled". It is a pity

that the book could not have been added to, and McClure, Collinson and Belcher given their true place in history.

It is gratifying to read of Matonabbee, the leader of the Hearne expedition from Churchill to the Coppermine, whom historians have so long neglected, though I would doubt that the quotation of some of Matonabbee's remarks will endear this explorer to the membership of Women's Lib, "Women are made for labour; one of them can carry, or haul, as much as two men can do. They also pitch our tents, make and mend our clothes, keep us warm at night. . . . Women though they do everything, are maintained at trifling expense."

I did find one or two errors, e.g. on page 36, "A fleet of fifteen vessels was assembled, the largest ever to sail to the Canadian Arctic, a record that has yet to be bettered." Not so, the 1955-57 D.E.W. Line support fleets greatly exceeded this number. In 1955, not 1958 (page 72) when the author was embarked in H.M.C.S. *Labrador,* the Foxe Basin Task Group, which was just one of three operating in the Canadian Arctic, consisted of some twenty-two vessels. Page 73, "Or flogged at the masthead", an extremely difficult manoeuver as there is no place for the flogger to stand unless, of course, flogger and floggee, like the angels, could assemble on the head of a pin. My personal preference was to flog visiting authors at the gratings or at the Stretcher on the lower shrouds, just above the Deadeyes, this location was also favoured by the Royal Navy and many Pirates. Page 73, "Equally rarely can they (ships) expect to get through the Prince of Wales Strait to the Southward." Not so. Ice concentration data, collected by Northern Associates over a ten-year period, have shown that the Prince of Wales Strait route is much easier of access than the route through McClure.

Despite the nit picks, "Arctic Fever" is a splendid book, informative and easily read and I have no hesitation in recommending it. Hope the author will find time to write companion volumes of the same calibre, on other aspects of the Canadian Arctic.

*O. C. S. Robertson*

CANADIAN WILDLIFE SERVICE 1971. *Ottawa: Department of the Environment, 1971. 8½ x 11 inches, 87 pages, illustrated. $1.00 (paper).*

I began reading this small volume strongly prejudiced by friendship and admiration for many distinguished biologists in the Canadian Wildlife Service. The durability of their careers in providing interesting and valuable information about the wild animals of Canada reflects long persistence at their observations in the field and a management that has sustained thorough studies and compilations of reports. Sections that deal with species and localities appear over the names of individuals, often with their own figures showing in the illustrations. There are evidently many fresh careers in course of development to maintain the strength of the organization.

The striking illustrations are prepared from well chosen photographs that show birds and mammals in characteristic positions and situations. Looking at the cover, showing a common puffin holding three fishes in its bill, arouses curiosity as to how it can capture fishes number two and three while holding number one. The puffin's beautifully marked and coloured bill is evidently well designed for manipulation of its prey. Three sturdy muskoxen stand dark against blue-tinged snow and background. The bluish tint that also appears on their rough coats seems, however, like an aberration of colour in printing rather than in nature. Some of the other coloured illustrations are likewise rather unnaturally tinted; but they are often magnificent portraits of living animals in action, like the splendid bull caribou swimming with its antlers reflected in the smooth surface of a northern lake.

Illustrations indicate methods employed in the study of wild populations. Tom Manning astride a good sized polar bear, the bear subdued by drugs, is shown while his associate marks the bear for studies of the range and habits of populations of these great beasts. The brief report of the travel of bears was especially interesting. It referred to a publication on the subject that I am now seeking to obtain. I could have wished that other reports on the varied operations referred to publications, of which I know that many are available. I presume that lists may be obtained from Information Canada.

Descriptions of studies in progress and the ways in which they are carried out are clear and unpretentious. They are agreeably free from the tiresome arguments about their essential significance that now often introduce reports on the state of the natural environment. I think that it is impressive that the Canadian Wildlife Service can assume that well illustrated studies of wildlife are obviously interesting and will be accepted for that value by the public. By this attitude the Service demonstrates confidence in the competence of its personnel and shows its respect for the understanding of its readers.

*Laurence Irving*