

minology of the International Permafrost Association. The glossary, therefore, has both national and international acceptance and is recommended as a useful reference for those involved in permafrost-related fields.

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**POLAR BEARS.** By IAN STIRLING. Photographs by DAN GURAVICH. Ann Arbor: The University of Michigan Press, 1988. 220 p., 2 tables, 8 figs., 163 colour plates, index, bib. Hardbound. Cdn\$55.00; US\$50.00.

Ian Stirling set out to write "a popular but scientifically accurate book" on polar bears that the reader wouldn't "need a university degree to understand." After 18 years of studying the polar bear and its environment the author has far surpassed this commendable objective.

This volume transports the reader into the polar bears' world. The author sets the scene with information on the available pre-historic knowledge on polar bears and how these carnivores may have evolved within the arctic ecosystem. We are then offered a view of the polar bear in the legends and spiritual beliefs of the Inuit. Stirling stresses the importance and respect this marine mammal holds for these indigenous peoples. This is accomplished through a discussion of how polar bears are and were used by Inuk hunters and by recounting legends and anecdotes that provide a clear image of the polar bears' cultural importance. The author acknowledges the Inuit as the "original polar bear watchers."

The third chapter presents a clear, concise description and review of the techniques that have been developed by scientists enabling them to study polar bears. This review does not attempt to gloss over problems or controversial topics, such as the long-term effects of handling polar bears. Instead, Stirling takes a hard look at the available data, presents a conclusion based on the analysis and his 18 years of study, and finally suggests that scientists studying bears will continue to try to improve the techniques employed. This chapter is much more than "how to study polar bears"; it successfully lets the reader see and appreciate the difficulties that researchers face working on this species. This chapter also frankly discusses the advances that have been made in the area of chemical immobilization of polar bears in the past 20 years. These advances have clearly made handling polar bears today much safer for both the bears and researchers. Stirling allows the reader to feel what it is like to work in the Arctic. His honest, insightful description of one experience where a bear that had received too much drug was given artificial respiration gives an inner glimpse of what working on polar bears can be like. However this anecdote doesn't end there but also provides us with a view of Stirling, scientist and conservationist, who was concerned about the long-term effects this experience might have had on this bear: "However, we caught her again the following spring. She was in excellent health and accompanied by newborn cubs" (p. 55).

After these early chapters, the author presents the life history and general population dynamics of polar bears. Chapters are divided into these general categories: distribution and abundance, reproduction, behaviour, life and death, and what makes a polar bear tick (a chapter on general physiology). Each of these chapters provides a wealth of information on what is currently known about polar bears. However, we are not presented with a listing of scientific data; instead Stirling leads us through the life cycle of polar bears, describing seal hunting, seasonal movements, breeding behaviour, raising cubs, and many other topics. At each step in this cycle we learn and come to appreciate how the polar bears' environment

is always changing and how this animal has adapted to the change. The author clearly points out that the key to survival in the arctic environment is to explore and adapt to change. Throughout these chapters we learn of the intricate relationship of behaviour and ecology that exists between arctic seals and polar bears.

Although a great deal of scientific data exists on most of the topics discussed in these chapters, the author has managed a very readable synthesis of this material that provides the reader with a clear understanding of the ecology of the polar bear. In addition, he has properly pointed out what information is speculation, where populations differ on certain parameters (i.e., age of first reproduction) and, importantly, what scientists don't know about this species.

A separate chapter is presented dealing with the polar bears of Churchill, Manitoba. After a brief review of some historic records from the Churchill area, Stirling documents the management efforts and concerns as well as research findings that have occurred over a 20-year period. As Stirling has conducted the majority of this research during this period, he presents a clear interpretation of the problems that were faced in and around this community. This chapter indicates not only how research programs gathered data needed to properly manage the polar bears in the region, but also how these data filled in information gaps that existed in the understanding of polar bear behaviour and ecology. Stirling and his colleagues filled in these gaps and assisted with the conservation-oriented management programs in effect today.

The final three chapters deal with the polar bears' relationship with man (past, present and future) and with its ever-changing environment. The author details the current management practices in place and also how these practices have reached their present status. Perhaps the most important and impressive management tool reviewed is the 1973 IUCN agreement on the conservation of polar bears and their habitat. This international agreement is unique in that five circumpolar nations have worked together to protect and preserve polar bears and their habitats.

Without taking positions on hunting, human activities, and development in polar bear habitat, the author points out in the closing chapter what is known about environmental threats to polar bears and what the future may hold for other non-consumptive uses of this species. This chapter also includes information on recent developments in which Inuit are assuming management responsibilities for this species, which remains an important component of their cultural identity.

This is a well-written book that allows the reader to learn about the polar bear and its interrelationship with its environment in a way that few books do. Although a great deal of scientific data is presented, it is done in a manner that makes reading a pleasure. First-hand anecdotes, experiences, and Inuit lore provide the reader with a sense of discovery that Ian Stirling seems to still possess after 18 years of studying Nanook. Excellent colour photographs give us a glimpse of the polar bear's world and some of the behaviours described in the text.

However a large proportion of the photographs are not accompanied by captions. On page 18, for example, there are at least 20 bears in the photograph, yet we are told in the text that polar bears "normally live a solitary existence." Surely a photograph of this nature deserves some comment, if only to explain the unusual concentration of bears and where the photograph was taken. Numerous other photographs also deserve captions and would have been easier for the reader if they would have accompanied the corresponding text.

In the chapter on "how do you study a polar bear," no mention is made of applying numbers or letters on captured bears with dye when they are handled. This common and important technique has been used in many studies and in polar bear control programs in Churchill. I assume that for aesthetic reasons no photographs of marked bears were included in this book. Although a series of photographs show various postures associated with play behaviour (p.

101-103 and p. 153-155), this activity is not included in the chapter on "behaviour" but rather in "the polar bears of Churchill" chapter. Since this is a ritualized form of social interaction, it cannot be clear whether there is indeed a "loser" (p. 103) in these interactions, as the caption suggests. The figure caption for the adult male fight sequence (p. 153) refers to "... posture taken when two adult males fight," while the figure caption on p. 154 refers to this "ritualized behaviour."

It is unclear whether these sequences represent play fighting, ritualized play behaviour, or fighting. Or perhaps these are one and the same. I assume that two males fighting over access to a female in oestrus would be more than a ritualized behaviour. Again, more detailed figure captions would have been useful.

In the final chapter the author points out the economic benefits than can occur when polar bears become a "tourist attraction." No mention is made of some of the negative impacts that can accompany this type of undertaking, specifically, the consequences of using baits to attract bears in order to obtain "close-up" photographs or to encourage social interactions between bears. There also remains the question of bears habituating to humans and the unknown long-term effects of this. These issues deserve mention.

Although more detail could have been included in each chapter, the reader is provided with a well-rounded bibliography if further information on a specific topic is required.

Regardless of these small flaws, this well-written, handsome volume, with ample well-reproduced colour photographs, will provide the student, naturalist, and anyone interested in polar bears a unique view of this species and the world it inhabits. Although the price of this book is substantial, it is a work that will long be at the top in this field and therefore a valued edition in any library.

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**SLEEPING ISLAND: THE STORY OF ONE MAN'S TRAVELS IN THE GREAT BARREN LANDS OF THE CANADIAN NORTH.** By P.G. DOWNES. Foreword and notes by R.H. COCKBURN. Saskatoon: Western Producer Prairie Books, 1988. 330 p., 17 black-and-white photos, 6 maps, bib. Softbound. Cdn\$18.95.

*Sleeping Island*, first published in 1943, is the story of an annual vacation — a vacation very different from that taken by the average person, because this one takes place in the wilderness and the barrens of northern Manitoba and the Northwest Territories by a person whose approach was that of going home. The North, of course, was not Downes's home, as he was not a native to the area, but over a period of years he took many trips to the northern prairie provinces and the Northwest Territories and he learned to love the land, its barrenness and its wilderness. And he learned to love the people, both the Indians and the Inuit. His preparations for these journeys were based on his experiences from previous journeys and his extensive reading on the area. The outfit he prepared for himself was boastfully small and inadequate but resulted from much hard discipline from previous years. "The North is vast, distances are great. To travel at all, a person must travel fast as the Indians do. To do this — by oneself or with Indians — one must travel light."

Downes had a unique approach to making preparations for his journeys to the North. There was none of the weeks and months of "painstaking plotting and planning to defeat the great empty spaces." With gradual warming days of June, he "became daily more restless and at last picked up my packsack . . . and set off."

The years that he spent roaming in the various parts of Canada's vast northland prompted the question among his acquaintances: "Why?" He could never find an answer to that question that was satisfactory to the logical and kindly questioner. He just liked it

there in the land of the little trees, he was happy there, but to any reasonable person this answer was inadequate.

His destination for the trip in 1939 was not known or even seriously considered when he left home. Ideas sprang to his mind from trips of previous years when he had visited Great Bear Lake and cast his mind toward the East. There were friends in that area that he had met on other trips and he wanted very strongly to visit with them once more.

He travelled from his home in Boston to Winnipeg, which provided a good jumping-off spot. It was here, while in conversation with one of the northern commissionaires that he determined to travel to Nueltin Lake. This involved canoeing on uncharted rivers from The Pas in Manitoba, through the Reindeer Lakes and on over unmapped but intriguing areas leading to Nueltin Lake. He knew that on such a trip he would once again meet many native friends from earlier journeys in the North.

It was in Brochet, in northern Manitoba, that Downes reached the point in his journey where he would commence his real trip by canoe. He needed a partner and his preference was for an Indian who knew the land, knew the dangers and would be a real asset even though he may not know the land in which they would be travelling in detail. On this trip he was unable to find an Indian willing to travel where he wanted to go. But he did find a non-native familiar with the North — a large man reputed to be an excellent canoeist. They set out from Brochet, following a long series of rivers, making observations along the way, ultimately reaching Nueltin Lake. Here they came upon Sleeping Island. Sleeping Island, itself, does not play a big role in this story, but it was indicative of the many islands where the natives camped on their traverses across the country. Most of the story is taken up with this canoe journey. His return home from the North involved commercial ships and aircraft from Nueltin Lake. It was a much quicker return than the trip to Nueltin Lake, but much less interesting.

Everywhere that Downes and his partner travelled and met people, there was someone in the group of natives whom he had met on previous occasions and with whom he had formed a close kinship. Meeting these people again provided great satisfaction for Downes. It is this feeling, permeating the whole story, that is particularly appealing and provides the unique aspect of this book.

The account of the trip taken by Downes is taken directly from the daily diary he kept throughout the trip, from the time he left until he once more returned home. He carried out limited mapping, made observations and notes on the trees, birds, animals, and geology of the area, and followed other scientific interests as well, as he had in all of his several trips to the North. On top of these activities, he did what was most appealing to him — he frequently stopped during the day just to enjoy his surroundings. He was in tune with the environment!

Most books on the North deal with the activities of people who work there, be they game wardens, hunters, trappers, miners, visitors or whatever. Downes went to the area because he loved it. That care and concern for the North is expressed in this story. The trip took place in 1939, before much of the technical development had made serious incursions into the North, spreading the white man's sense of values and his technology throughout the North. Downes appreciated this area for what it was and had been over the centuries. He would probably be very unhappy with what has happened to the land he loved.

This book is well written. The story moves along very quickly and keeps the reader interested at all times, particularly when Downes and his companion had to fight many dangerous rapids on their journey. This book will appeal to anyone who appreciates the North and can enjoy the value of "going back to nature."

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