1994, roughly equivalent to 25,000 minke whale carcasses". The authors report that the effects of Whale Watching tourism on Killer Whales and others are unclear and still deserve more research.

The reader will find the overview table about cetaceans' conservation status and IUCN categories of great value. By-catch, habitat degradation and hunting are among the 16 prime threats for the conservation of cetaceans. The hot subject of 'by-catch' is not covered in much detail, but at least it is mentioned. Dams in rivers can interrupt and fragment sea mammal populations. Military exercises and industrial blastings; e.g., from oil explorations, are well known to be harmful as well.

"Until quite recently, oceans and even rivers, were perceived as almost infinite sinks that could absorb human waste with no impact on humans and little harm to the environment." How true. The MARPOL convention is supposed to fight marine pollution caused for instance by plastic, chemicals, oil or sewage (still, none of the coastal Canadian cities have a sewage system worth mentioning). The book emphasizes nicely that habitat degradation is the major component threatening the entire marine ecosystem (two thirds of the world) and that there are no administrative and national boundaries to pollution, nor to whales (animals move beyond borders and don't care about national and administrative units). The authors present a chapter on Conservation, Protection and Science which shows how scientists can contribute to this important task.

Besides giving a perfect overview and summary about current cetacean research topics, this book also shows what still needs to be researched. For instance, the book points out that nighttime research on killer whales does not exist. Behaviour approaches to systematics and taxonomy could be useful as well; so could be many aspects of behaviour-based predator-prey studies.

For my personal taste, too many of the questions asked and addressed in this book deal with "investment" and energy effort, somehow resembling pure money and banking issues, and making cost and egoistic gain considerations rule. Our behaviour research is ill-fated if only the bank/money approach, which humans face in their daily life nowadays, gets completely transposed on animals and behaviour interpretation; is that all what the science of animal behaviour currently can offer? It simply presents a limited view, and a plain copy of approaches applied to monkeys, and used earlier by Nobel-prize winning Gary Becker *'The economic approach to human behaviour'*.

Unfortunately, results and contributions from "scientific whaling" are not included in this book. Might be there are none; time will tell. Proceeds from this affordable volume go towards a fund to support graduate students on behaviour studies. This milestone reference is a grace to review and to read. Every naturalist and wildlife scientist should have it in her/his bookshelf.

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BOTANY

Lichens of North America

By Irwin M. Brodo, Sylvia Duran Sharnoff, and Stephen Sharnoff. 2001. Yale University Press, New Haven. 795 pp., illus. U.S.$69.95

Exquisite, aesthetically pleasing, wonderful, breath-taking, and magnificent barely describe the 32 full-page color pictures and nearly 900 hundred smaller ones in this book. Although they alone are worth the price, there is much more in this book. A total of 804 species are illustrated plus 250 other common North American lichens are included in the keys. These species represent about 30% of the lichens in North America.

The book has two major parts. "About the Lichens" occupies the initial 113 pages, and is composed of 14 chapters that enumerate lichen features, biology, including discussion of the symbiotic relationship between fungi and algae that make the lichens, colors, chemistry, habitats, distribution, and classification. Additional chapters treat lichens and people (food, clothing, dyes, perfumes, medicines and poisons, human impact on lichens, and much more), environmental monitoring with lichens, collecting and studying lichens, and how to use this book to name a lichen. The text is supplemented with photographs and drawings to illustrate salient points. The writing is careful and deliberate, so it does not scare off newcomers to the lichens. Concepts, features, and methods are explained simply but in detail. As with any specialized area there is terminology to be grasped. Words that may not be familiar to naturalists are explained in the text where they first appear and the glossary is also an aid to understanding terms by giving a description and often a reference to a figure.

"Guide to the Lichens" begins with a 27-page key to the identification of lichen genera and major groups. The use of a "key" is explained in chapter 14. The largest part of the book is a chapter, of 604 pages, titled "Description, illustrations, keys to species, and maps". The lichens are arranged alphabetically by genus. Thus if you know the name of the lichen it is easy to find its description. I like the alphabetical arrangement but others would prefer a grouping of similar types (i.e., all the orange species together or all the foliose species grouped), such groupings are used in the keys.

The treatment of each lichen is composed of several parts. In addition to the color photograph, there is the scientific name and, for many, a common name. The essential features, concentrating on the macro characters, of the lichen are enumerated as is the habitat, but habitat comments are brief, probably due to space limitations. For example, *Solorina crocea* in south central British Columbia is common in dry lodgepole pine forests on sandy soil, whereas the text states "usually in moist spots ... or seepage areas in arctic or alpine sites." The geographic distribution of each species is shown on a map.

Maps fascinate me. And they convey a considerable amount of information. The maps quickly tell the user whether the lichen is found in one's neighborhood. Disjunct distributions can pose intriguing questions. Why does *Parmotrema stuppeum* occur only in two areas that have little apparent similarity, the Appalachian Mountains and a narrow band along coastal California? Current distributions can reflect earlier phenomena. *Umbilicaria caroliniana*'s occurrence in only two Ice Age refugia, in the southern Appalachians, and northern Alaska and the Yukon, suggests it was widespread in pre-Ice Age times. Other species, like *Peltigera aphthosa*, are widespread and their distribution may reflect its ability to compete effectively with other plants.

Reviewers routinely trumpet the glories of the subject but they should also aid the users by indicating difficulties. There is little to complain about in *Lichens of North America*, and then the items are quite minor and do not distract from the quality and usefulness of the volume. When I first opened the book, I was struck by the beauty of some full-page and smaller photographs (for example, pages ii–xvi, 114, 116) and wondered which lichen I was admiring for these pictures were not labeled. The Cup Fungus (page 4) although labeled *Aleuria aurantia* has the morphology and habitat of *Sowerbella rhenana*. The distribution maps show all of Canada and the United States, except Hawaii. Most are useful, but lichens of restricted distribution are uncertainly discernable on the map (e.g., *Lecanora phryganitis* and *Niebla combeoides*). For these species arrows indicating their location or a restricted map (i.e., only of the southwest) would have been more informative. Figure 533 is slightly out of focus in my copy of the book.

Brodo has had a long association with The Ottawa Field-Naturalists' Club and its journal *The Canadian Field-Naturalist*. The OFNC can be proud of its support of the publication of *Lichens of North America*. And the other benefactors are to be thanked for foresight in supporting this project. One direct result of their participation is the high quality of the printing and binding and the book's relatively low price!

This book is the end product of an enormous project that took years of devotion to complete. Brodo writes (page xx) "the road to a finished manuscript was a rocky one,..." And one rock, reported by colleagues in Ottawa, was when managers at Canadian Museum of Nature, where Brodo spent most of his career, at one period near its completion prohibited work on the project. Brodo persevered at home during evenings and weekends; however, for support at the end, the title page graciously states, "published in collaboration with the Canadian Museum of Nature," and the CMN is also fairly acknowledged for its career support of Brodo's fieldwork and travel.

In summary, the book is highly recommended. The style of writing, the superb photographs, and the reasonable cost are unbeatable. A glimpse at this book should be sufficient to convince naturalists, ecologists, and others to get involved with this fascinating group of organisms. Some of the photographs in this book can be seen at www.lichen.com where one can also find more background on lichens, the preparation of the book, and the authors and their interests. Regrettably, Sylvia Sharnoff did not live to see the final publication.

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