

seems to come as easily to Eisner as sneezing comes to most of the rest of us.)

The greatest thing about Eisner, however, is that he keeps the passion alive, and dwells not on the institutional politics of science, but on his life-long fascination with the creatures that he studies. Eisner is a chemical ecologist, and thus the book is largely about insects and the chemicals they produce. But don't get the impression that it is technically difficult to understand. It begins with a chapter on bombardier beetles, and the amazing way that they spray boiling quinines out their butts, and direct them accurately into the faces of their enemies. This chapter, like the others, does a nifty little dance between the insects and their adaptations on the one hand, and the process of scientific discovery on the other. The rest of the book is just as spellbinding, and in it the reader is treated to such juicy tidbits as explanations of how living things can defend themselves with cyanide without accidentally committing suicide, along with a host of other marvelous insect adaptations, all skilfully elucidated by Eisner, his colleagues, and his students. The chapter on spider webs is wonderful. And if you think you understand insects and mimicry, this book will surely

expose you to vast unexpected dimensions to this supposedly simple phenomenon.

Thomas Eisner is also a superb photographer, and one of the other great strengths of this book lies in the pictures. He also uses clever illustrations to make his point, and is clearly the sort of person who is good at entertaining his undergraduate students while he teaches. All of this comes together masterfully, to create a very fine book indeed. Do I have any criticisms? Not really, although for a book about "insects" it contains a wealth of information on arachnids as well. I suppose Eisner and his publisher didn't want to use the term "arthropods," or the term "bugs" to get around this perennial problem. No—this is a superb book, and a book that naturalists at all levels will enjoy. At the weekly entomology luncheon at the University of Alberta, I found that many of my senior colleagues (very well-read and enthusiastic entomologists!) were amazed by how much they learned from "For Love of Insects." I enthusiastically agree, and recommend it heartily.

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The Freshwater Fishes of Manitoba

By Kenneth W. Stewart and Douglas A. Watkinson. 2004. University of Manitoba Press, 301 St. John's College, University of Manitoba, Winnipeg, Manitoba, R3T 2M5. xvii + 276 pages. \$29.95. Paper.

This book is a delight to read and use. The layout is innovative and the text is in an exceptionally clear font and is well written. The book is dedicated to the late Dr. Ed J. Crossman of the Royal Ontario Museum and co-author of the book *Freshwater Fishes of Canada*.

The freshwater fishes of Manitoba comprise 79 native species, 1 re-introduced species after extirpation, 10 introduced species, 2 artificial hybrids and 4 estuarine species from the Hudson Bay coast. This is the third most diverse ichthyofauna in Canada after Ontario and Quebec. Fifteen species from waters outside, but neighbouring Manitoba, are included as they may eventually be discovered in the province. There are various introductory sections such as biogeography, geography, species diversity patterns, and summary sections like a glossary and a checklist, usually found in fish books. There is also an appendix which summarises fish distributions by watershed and a list of references. There is no index but the unique layout assists in navigating the pages.

The presentation of the book is very attractive and easy to use. Each family account with its species has a unique colour which appears in text headings, scientific and common names here and in tables elsewhere, and along the upper half of the outer page margin (outlining the English and French names) which allows rapid flipping as a search mechanism. It is immedi-

ately obvious when one moves from one family to another in the text and quick searches for a particular group are facilitated. The scientific and English family name is at the top right and left of each page and also allows rapid flip searches.

The series of habitat photographs in the geography section are excellent, and have descriptive comments. One, showing the lower Churchill River could be almost anywhere in the vast boreal forest except for that peculiar hazard to Manitoban freshwater ichthyologists, a Polar Bear paddling by.

Each species account gives the English, French and scientific names, a colour photograph of the fish, a section on Identification with key characters in bold (sometimes only a single, short sentence for distinctive species), a Distribution in Manitoba, Biological Notes including spawning, growth and adult size, feeding, habitat, and ecological role, and Importance to People. The latter refers to commercial, angling, ecological and conservation importance. There is no lengthy anatomical description of the species as is seen in most fish books, characters being restricted to those used in identification with some explanation of colour variations and amplification of characters from the Keys.

All the fish illustrations are ideally positioned in the species description rather than grouped as colour plates. These photographs are generally excellent, although some key characters such as mouth parts are not evident and a close-up photograph of them would have added to the reader's understanding.

The distribution of fishes on the maps is very clear. Red spots show known occurrences, black spots introductions while grey shading shows the continuous range of native species. The grey shading generally conforms to distributions based on the red spots, filling in the gaps. However in a number of species, the limits of grey shading conform neither to the red spots nor obviously to drainage basins. There is no explanation of how this overall distribution was arrived at but is presumably related to ecological limits for the species and physical barriers. Some form of shading to fill in lakes would have made the background map clearer and perhaps partially address the previous comment.

Identification keys for each family are found at the beginning of each family account. An alternative arrangement is to group all keys together and this is one many field and laboratory biologists would prefer. Fish are wet and slimy and having keys grouped together makes for less page turning or facilitates xeroxing and annotating. The keys work well although the one for distinguishing the Brown and Black bullheads gives diagrams of the supraethmoid shapes without explaining what or where this structure is (and it is not in the Glossary either).

Some other minor points of criticism and comment must be noted. The scientific names lack the author and date, perhaps not of significance to most readers but a nuisance to find for those not familiar with the ichthyological literature. The copy I have lacks paper covers and there is only the briefest of blurbs on the authors whose names are sufficiently common not to lend themselves to easy Googling – more background on the authors is often of interest to readers. The common names of fishes in English and French are on the margin of each page enabling a rapid flip through as a search. However the scientific name is not there (and there is space to add it) which would have been a great convenience. It is necessary to remember to flip back to front as well as front to back since some species are only on one page; this is inescapable in the design. The key to Cottidae is a little confusing as “Key to the freshwater sculpins and marine sculpins

of the genus *Myoxocephalus*” as this can be read as being a key to only *Myoxocephalus* species although *Cottus* species and freshwater *Myoxocephalus* are included. The photographs note whether a specimen is fresh or preserved but readers should be warned that preserved here generally means very recent preservation as colour is still retained – museum specimens of any age soon lose the colour; compare the colourful “preserved” northern redbelly dace with the really preserved and brownish deepwater sculpin. A few photographs are not as revealing as one could hope for, the colourful sticklebacks being poorly served in this respect. The Glossary is good, distinguishing such terms as bar, band and stripe although commensal is more commonly spelled commensal and watershed is not a “water body together with all its tributaries” but strictly “an elevated boundary area separating tributaries draining to different river systems”, and the subopercular bone does not lie completely above the interopercular but mainly behind it (see www.brian-coad.com).

Although books on fishes do tend to separate into those on marine species and those in fresh waters, the Manitoban coastal fauna on Hudson Bay comprises only 27 species (Coad and Reist 2004) and could have been included in the book. The authors do in fact deal with 13 of these species which are found in estuarine and fresh waters also. So another 14 species would have given a complete treatment of the Manitoban fishes.

This book will long stand as the definitive guide to Manitoban freshwater fishes and sets a standard for all subsequent provincial and national books of fish faunas.

Literature Cited

Coad, B. W., and Reist, J. D. 2004. Annotated List of the Arctic Marine Fishes of Canada. Canadian Manuscript Report of Fisheries and Aquatic Sciences, 2674: iv + 112 pages.

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The History of Ornithology in Virginia

By David W. Johnston. 2003. The University of Virginia Press, Box 400318, Charlottesville, Virginia 22904-4318 USA. 219 pages. \$35.00 U.S. Cloth.

True to the promise implicit in his title, David Johnston's book is a thorough history of ornithology in Virginia. The first five chapters take us from the Tertiary period 65 million years ago through to an examination of 19th-century reports and collections. Along the way we learn all manner of interesting facts. The abundance of skeletal elements of the extinct Passenger Pigeon show it to have been common in the late Pleistocene over 12,000 years ago, and Rock Ptarmigan, Spruce Grouse and Gray Jay remains indicate a cooler climate at the time. Archaeological research at

a 1700-year-old Indian midden provided the state's only record of the Ivory-billed Woodpecker. Around 1650, early English settlers were so hungry that at times they ate bluebirds, larks, cardinals and goldfinches – and Carolina Parakeets – as well as waterfowl, shorebirds, and upland game birds. When settlers arrived from England about 1590, the Indians were cutting holes in gourds to entice Purple Martins to nest.

The chapters on early observers and naturalists are particularly interesting. Thomas Hariot, a young man selected by Sir Walter Raleigh to be part of the 1585 expedition and settlement, made one of the first attempts to list North American birds, but Johnston tells us that Hariot's list of 111 species has never been found. Fortunately, the paintings of John White, Har-



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