

Furthermore, the species accounts provide current information about their biology and distribution within Canada.

I was particularly favourably impressed because the information in the book is drawn from many recent studies of bats. Whether one is reading about echolocation or about reproduction, the latest works are cited. Not only has Dr. van Zyll de Jong put the material in a Canadian context, he has made it easy for a novice about bats to obtain a general introduction to them and to begin to explore the current literature about them.

Whether one wants to see which species of bats occur in Prince Edward Island, or what is known about the biology of *Myotis evotis*, this book is an ideal source. By asking field course students to use it, I have established that the illustrated key to whole

bats works well, even for species of *Myotis* that are superficially similar in appearance.

The book would have been more useful if it had included an index. The drawings of bats, whether coloured or black-and-white, are well done, but for some species these illustrations are less useful than the key when it comes to identifying a whole bat in the hand.

I highly recommend this book to anyone who is interested in bats in general or Canadian bats in particular. Whether you are a keen naturalist or someone teaching a class in mammalogy, van Zyll de Jong's book is for you.

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Listening in the Dark: The Acoustic Orientation of Bats and Man

By D. R. Griffin. 1958. Reissued 1986. Cornell University Press, Ithaca. 464 pp., illus. U.S.\$17.50.

In this book Donald R. Griffin explores the discovery of echolocation by man. The book focuses on bats and covers topics from laboratory studies to field research. The first chapter examines the nature of bats, from their wings and evolution to their economic and medical importance. The second chapter the "vital energetics" and migration of bats. Chapters 3 to 9 inclusive deal with different aspects of echolocation, from the history of studies of bat orientation to the behavioural performance of echolocating bats. Chapter 10 puts echolocation into a broader perspective, dealing with bat-moth interactions and the use of echolocation by marine mammals, while Chapter 11 discusses echolocation in oilbirds and cave swiftlets. The next two chapters address the possibility of echolocation by blind people, and artificial devices that might permit human echolocation. Chapter 14 considers the acuity of echolocation, particularly concentrating on the performance of bats in situations of high background noise. The last chapter reflects on the role of the experimental naturalist in modern science.

The writing is clear and easy to follow, although some may find it a bit technical. I am particularly enthusiastic about this book because it follows the development of an idea. At a time when it is easy to confuse technology with science, *Listening in the Dark* makes it clear that in the late 1700's the Italian Lazzaro Spallanzani had concluded that bats could "see with their ears". His conclusions were based on a series of experiments that manipulated the cues

available to the bats he studied. In *Listening in the Dark*, Griffin has demonstrated how technology permitted him and others to explore some of the ramifications of Spallanzani's conclusion.

Listening in the dark is a classic and its reprinting by Comstock/Cornell means that my students can get their own copies and I can replace my earlier worn edition. The foreword by James A. Simmons, one of the leading workers in echolocation today, permits a reader to appreciate some of the recent developments in echolocation and the depth of Griffin's perception.

Quite simply, everyone who is interested in bats and their orientation should read *Listening in the Dark*. It should also be reading required of biology students interested in animal behaviour. The book is FULL of interesting and exciting observations and often when you think that you have found something new about bats and echolocation, you read about it in *Listening in the Dark*. Just recently I experienced another of these situations when a colleague studying red bats in southwestern Ontario proposed that these bats eavesdropped on the echolocation calls of conspecifics to find vulnerable prey. Griffin discussed (page 200) this very possibility in red bats after observing them foraging over a miniature golf course.

I applaud the reprinting of this excellent book and recommend it as an informative and entertaining read.

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