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## **Bird Brain: An Exploration of Avian Intelligence**

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BOOK REVIEW

## ***Bird Brain: An Exploration of Avian Intelligence***

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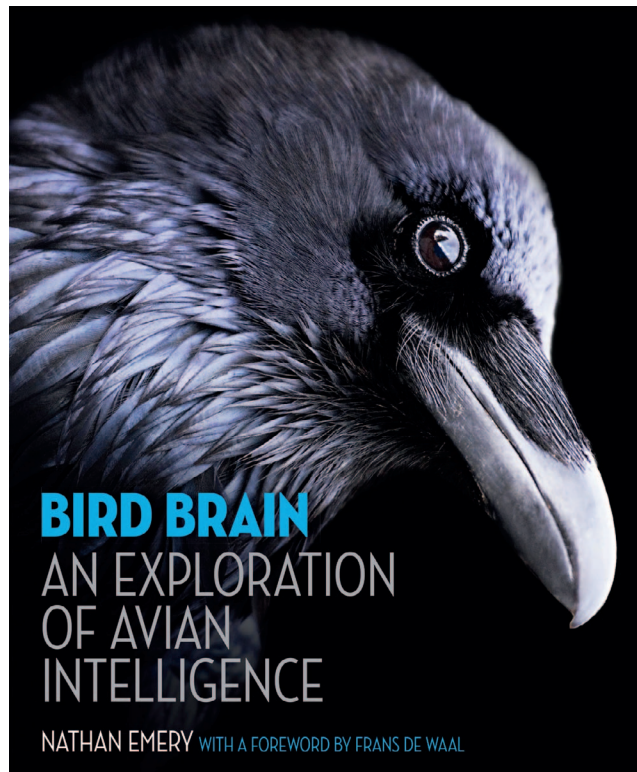
**Bird Brain: An Exploration of Avian Intelligence** by Nathan Emery. 2016. Princeton University Press, Princeton, NJ, USA. 192 pp., 175 color illustrations. \$29.95 (cloth). ISBN 9780691165172. Also available as an e-book from Amazon or Google Play for \$16.

Over the past 30 years, the study of bird behavior has been completely transformed by the ongoing revolution in cognitive psychology, opening up wholly new perspectives on the mental processes underlying such areas as foraging decisions, social intelligence, problem solving, memory encoding, and communication. Although these studies have contributed to a number of recent popular books, until now there has been no attempt to integrate avian cognition and recent findings in avian neuroanatomy and endocrinology into a single account that is attractive and accessible to a general readership. It is a steep challenge, but Nathan Emery has undertaken it in his remarkable new volume, *Bird Brain: An Exploration of Avian Intelligence*.

The book has a very interesting hierarchical structure. It consists of seven substantial chapters on separate broad issues—cognitive evolution, spatial memory, communication, sociality, tool making, metacognition, and a summary. Each chapter, in turn, is broken into a set of short essays (of one to three pages) on parallel topics or lines of experimentation that develop and amplify the chapter

theme. It is a very intuitive approach. Modern introductory textbooks often attempt to do the same thing by spreading sidebars and text boxes all across the page, making it look like a newspaper website. Readers will find Emery's innovation far less cluttered and easier to follow. The illustrations are really superb. The large format enables Emery to use big, striking images that draw the reader's interest. And he has some of the finest experimental diagrams I have seen in any behavior book. This is especially important in the later chapters on complex cognition, where the crucial studies use experimental designs that are very hard to envision from a purely word-based description.

By far the best and clearest writing occurs in the chapters on spatial and social cognition and tool making, which flow well and should be fascinating to the general ornithological reader. Several sections in the first third of the book, however, seem either oversimplified or dense and uninspired. More problematic are the many chapters that include one or more essays on the underlying neurobiology. It is understandable that Emery should have chosen to do this, because brain anatomy is one of his primary fields of expertise. But it does not generally work well. The accompanying diagrams are overly complex, sprinkled with opaque abbreviations and meaningless icons. The text of these essays includes unexplained terminology that may



be beyond the range of experience of the general reader. To be fair, I think that this may be a weakness of the parallel, hierarchical structure of the book. A two-page essay on bird behavior can implicitly draw on many familiar concepts and experiences, but a two-page essay on brain structure is not nearly enough to provide most readers with even a vague, basic grasp of the material. Indeed, the neurobiology could have been fleshed out by doubling the explanatory detail, but that would have created a much larger book.

The editing is rougher than one would expect. The book could have used at least one more really thorough pass to catch missing words, sentence fragments, punctuation errors, and dangling thoughts. One paragraph on avian color vision, for example, ends by noting that “There are important reasons why birds have evolved such a visual system.” But the author never tells you what they are. There are also a surprising number of scientific solecisms. It is hard to understand, for example, what the author means by “birds not mammals are the most recently evolved animals.” Contrary to what is stated in the book, American Robins (*Turdus migratorius*) do not breed in Guatemala; nor do Arctic Terns (*Sterna paradisaea*) raise young in Antarctica. The North Star is, in fact, visible everywhere north of the equator at all times of year. The brain of a hummingbird is actually considerably larger than a grain of rice. There are no Black-capped Chickadees (*Parus atricapillus*) in the Sierra Nevada. There are many more such minor, but irritating, inaccuracies.

From a scientific perspective, my biggest concern with Emery’s book is that the core evidence about the nature of

avian cognition is developed very loosely, using blatantly human terms—such as cleverness, intelligence, aesthetics, planning, deception, empathy, understanding, desire, and consolation—to describe experimental methods and results. This has become pervasive in popular writing about animal behavior, as it makes the text punchier, more exciting, and simpler to grasp, but it gives the unfortunate impression that birds are really Just Like Us, that they are actually just little people with beaks and feathers. This is, presumably, not what Emery intended as a take-home lesson. To his credit, he does insert brief caveats at many points to warn that things are actually much more complicated, or that this anthropomorphic terminology is controversial (or even unsubstantiated). But the warning notices are sometimes vaguely worded and readily ignored. The book does thoroughly demolish the idea that birds are all dim, instinctive robots, though I think few modern readers will still be clinging to that outdated view.

As a scientific text, *Bird Brain* is an imperfect product, but it is an exceedingly ambitious effort to combine modern research on avian physiology and anatomy with a wide range of findings on behavior and cognitive psychology. The narrative is rendered in an artistically attractive form that is approachable and entertaining for the general public. On the whole, Emery’s book is well worth looking into, if only for the daring of its approach. And if it inspires you to explore the literature further on your own, a well-selected bibliography is included for each chapter.

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