



BOOK REVIEW

## ***Listening in the Field: Recording and the Science of Birdsong***

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Published October 11, 2019

**Listening in the Field: Recording and the Science of Birdsong** by Joeri Bruyninckx. 2018. The MIT Press, Cambridge, MA, USA. 256 pp. 5 color illustrations, 25 black and white illustrations. \$35.00 (hardcover). ISBN: 9780262037624

Scientific collecting has long held a central role in ornithology. Ornithological collections, like other curated biological repositories, generally include physical specimens such as the skins, bones, and soft tissues of species collected in the field. Much of what we know today about avian evolution and ecology, including recent molecular findings, would not have been possible without access to scientific bird collections.

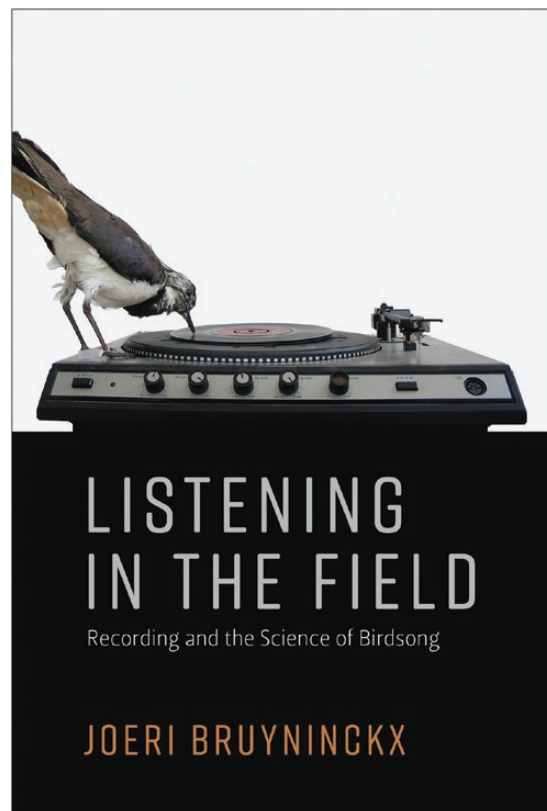
Yet birds are notable for their vocalizations as much as for their physical traits, and the diversity and complexity of birdsong has long captivated scientists and nonscientists alike. The problem has been in collecting and storing these sounds for later analysis. In *Listening in the Field: Recording and the Science of Birdsong*, Joeri Bruyninckx describes how the study of birdsong evolved alongside the development of new techniques and technologies for recording and analyzing avian vocalizations, eventually giving rise to today's vast curated sound archives and the modern scientific study of acoustic signals in animals.

Each of the book's 6 chapters considers a different aspect of the evolution of wildlife sound recording, focusing especially on the "analog era of recording" between 1880 and 1980 in the United States and Europe. Chapter 1 provides

a broad historical overview of this 100-yr period, while hinting at the various philosophical tensions and tradeoffs that were inherent in the field's development. As detailed in later chapters, these included tradeoffs between the authenticity of field settings vs. the sterility of controlled environments, the recording of natural ambient sounds vs. pure acoustic signals, and the popular appreciation of birdsong vs. the rigors of careful scientific listening. Bruyninckx returns to these and other epistemic distinctions throughout the book, eventually tying everything together in the sixth, concluding chapter.

It is hard to appreciate how challenging it must have been to study animal sounds before we had the ability to mechanically record them. Chapter 2 covers the half-century between 1880 and 1930 when the acoustic features of birdsong could be documented only through verbal descriptions, whistled imitations, or various forms of musical notation. Bruyninckx recounts the lively debates that percolated during this period about how to properly transcribe songs with pencil and paper. Onomatopoeic verbal translations were widely used, as they still are today (e.g., the "konk-la-ree" of a Red-winged Blackbird [*Agelaius phoeniceus*]),

primarily because they are so simple and easily understood. Musical transcriptions, by contrast, were considered more accurate, but they required musical training and skills unavailable to most amateur naturalists. Many different



specialized notations were introduced during those years. Indeed, there seemed to be nearly as many transcription methods as there were transcribers. Yet no form of verbal or musical notation could ever truly capture the intricate complexities of a singing bird.

It was not until the early 1930s, following the development of electrical sound recording, that fieldworkers were able to objectively capture the sounds themselves. Chapter 3 describes the impacts of these new technologies on both the study and the public appreciation of birdsong. Sound recordings became scientific objects, but also commercial objects used in movies, and even sold as record albums. A particularly memorable part of this chapter recounts the short-lived but pivotal collaboration in 1929 between a motion picture company and 2 Cornell ornithologists, Arthur Allen and Peter Kellogg, with the objective of recording wild birdsong for use as sound effects in movies. This to a large extent marked the beginning of the use of field recordings in the teaching and study of ornithology.

It would be many more years before sound recording equipment became portable enough for fieldwork. Early efforts involved aiming huge parabolic reflectors or placing multiple omnidirectional microphones at locations a bird might sing, each connected by hundreds of yards of cable to a large vehicle filled with sound equipment. Recordings were limited to locations near electricity sources, or else they involved transporting heavy dry-cell batteries or generators. In many cases songs were recorded onto wax discs, which had to be heated beforehand and required the equipment vehicle to be perfectly level for the recording stylus to run smoothly on the wax. At the critical moment, in anticipation that a bird might sing, a recording engineer would lower the stylus onto the wax. No wonder we have so few recordings from those years.

A central dilemma faced by early field recordists was whether to record sounds using a parabolic reflector or another type of microphone. In fact, this is still a debate today. Parabolas reflect and focus sound, almost like a telephoto lens, making a target signal at least 20 dB louder than the surrounding environmental noise. This seems purely beneficial, ostensibly, but parabolas can filter out the lower frequencies of an animal's signal along with other ambient sounds. A parabola-recorded song has a high signal-to-noise ratio, but it is also subtly acoustically distorted, unlike what a listening human or neighboring bird might hear in the field. As Bruyninckx explains, it is a tradeoff reflecting a much broader debate between the study of organisms in their natural environments vs. the controlled sterility of laboratory or sound studio analyses.

Chapter 4 covers the period following the introduction of magnetic tape recording in the late 1940s, when field

recording became progressively cheaper and easier. This in turn led to the growth of sound archives such as the Cornell Library of Natural Sounds (CLNS), the British Library of Wildlife Sounds, and others. The chapter focuses particularly on the history of the CLNS, which involved a unique system of collaborative exchange among birdwatchers, amateur field recordists, and diversely motivated biologists. It is a fascinating story, illustrating the importance of social capital in the establishment of such institutions, and it will be of particular interest to readers familiar with Cornell's Laboratory of Ornithology today.

Chapter 5 covers the same historical period but focuses on the scientific analysis of those recordings. By the 1950s, biologists were studying animal vocalizations using sound spectrographs, which allowed researchers to objectively analyze the acoustic properties of sounds as visual representations called spectrograms. It was an important scientific advancement, yet it also required specialized training, as it still does today. Thus, as in the late 19th century debates surrounding the use of complicated musical notations, this new technology provided preferential benefits to those with skills and training not available to most amateur naturalists. It is an interesting example of how history often repeats itself in the same old debates.

The book's narrative is most engaging when describing key figures and historical events, rather than the philosophical and cultural tensions of the time. Readers might be especially captivated by the various professional disagreements described in the book, such as the bitter quarrel between Robert Moore and Aretas Saunders in 1915 about how best to represent birdsong on paper, or the long-running international dispute between Britain's Ludwig Koch and Cornell University's Albert Brand about whether to record birdsong in its natural state, complete with ambient background sounds, or as focused, high-quality recordings using a parabola. I sometimes found myself unable to put these passages down.

Nevertheless, given the book's focus on events before the 1980s, some readers may be disappointed by the lack of information about more recent bioacoustic techniques and technologies. To be sure, this is not a book for those eager to learn the latest methods of digital sound recording and analysis. It is a book for lovers of history, particularly those interested in the events and controversies during the most important historical period in the study of animal sounds. It is a book that belongs in all university and museum libraries.

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