



DONALD J. BORROR, 1907-1988
(From a photograph taken in 1970)

IN MEMORIAM: DONALD J. BORROR

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With the death of Dr. Donald J. Borror on 28 April 1988, biology and the field of ornithology lost one of the pioneers in the relatively young discipline of bioacoustics. Borror was born in Ohio on 24 August 1907. He began recording and studying animal sound just after World War II. At that time, war-related technological advances for capturing and analyzing sound were just becoming available to the public.

Though by training and profession an entomologist, Borror's interests encompassed natural history in general and bird vocalizations in particular. As an entomologist and naturalist he

is known best as an expert on the order Odonata and for his books, "An Introduction to the Study of Insects" (1954, 1964, 1971, 1976, and 1981; with D. M. DeLong and later C. A. Triplehorn) and "A Field Guide to the Insects of America North of Mexico" (1970, with R. E. White). Ornithologists know him from his many papers and phonodiscs on bird song. He was a Fellow of both the American Ornithologists' Union (1978) and the Entomological Society of America. He was an Emeritus Professor of Entomology at The Ohio State University, where he received an M.Sc. degree (1930) and a Ph.D.

degree (1935), and taught until his retirement in 1977.

Borrer obtained his first magnetic tape recorder in 1947, and made his first recording in the spring of 1948. He was fond of relating that the recorder was portable because "it had a handle." Although it weighed in excess of 30 pounds and was encumbered by a 250-foot extension cable, it was still far more adaptable to the field and far less expensive than equipment previously available to such notable field recording forerunners as A. A. Allen, A. R. Brand, and P. P. Kellogg of Cornell University.

Initially Borrer's interest in recording was as an aid to teaching bird and insect identification. As a taxonomist, however, he could not resist the temptation to describe the sounds he captured. He might have been unsuccessful but for the introduction to another instrument developed before and refined during W.W. II, the audiospectrograph. With his colleague, C. R. Reese, Borrer published the first bird voice prints, or sonograms, in the avian literature (Wilson Bull. 1953). This pioneering paper demonstrated, among other things, that some birds produce two independent sounds simultaneously. More important to Borrer's continued research was his recognition of the potential sonograms offered for analysis of intraspecific song variation using sounds recorded from wild birds in the field.

As a consequence of these events, Borrer made more than 15,000 recordings of animal sounds over the next four decades, and most were used in support of more than 50 research publications on avian communication. Research by his students and associates at Ohio State University further enhanced what is today one of the foremost public collections of animal sound recordings. The collection is now housed in the facility named for him shortly after his retirement—The Borrer Laboratory of Bioacoustics (BLB). Sixty-eight percent of the recordings in the BLB today were made by Borrer.

Borrer's bird vocalization studies focused on intraspecific variation in the songs of North American species of birds. He recorded in each of the 49 continental states and may have more recordings to his credit than any other single recordist. As a consequence, there is incredible depth in the recordings for most species in his collection. I once asked Borrer if he did not wish that he had traveled more broadly in his years

of collecting. He allowed that his participation in the Pacific Theater war effort was all the world travel he cared to experience and, more seriously, that there was more than enough to document at home.

To that end he was diligent. Borrer was in the habit of visiting certain locations at about the same time every year. For many of these locations he obtained recordings of many species for nearly 40 consecutive years. These repeated samples supported the research effort of one man, and today they are a valuable, if not unique, resource for future studies, especially studies of song pattern variation in time.

Those who inherit the fruits of this man's labor must be grateful not only for his collection of animal sound recordings (and of insect specimens) but also for his organization. His taxonomist's view led him early to recognize the sounds he captured on magnetic tape as legitimate specimens and to appreciate that such a collection shared many of the curatorial problems attendant to natural history collections generally. Borrer once told me that he knew when he made his first recordings how these invisible "specimens" needed to be organized after capture on field tapes. He also claimed, though this may be apocryphal, that he enlightened Kellogg, founder of the Library of Natural Sounds, of his method during their only visit as the two sat floating on Cayuga Lake in inner tubes one hot Ithaca summer—and the two indeed used a similar method. Borrer's procedures for documentation and retrieval were so well developed and maintained that a recent conversion to a computerized catalog system required little modification or translation.

Phonodisc production for popular consumption was an obvious extension of Borrer's work. His first phonodisc, appropriately called "The Songs of Insects," was co-produced with his student, R. D. Alexander, and published by the Cornell Laboratory of Ornithology. He produced or co-produced 11 phonodiscs many of which are now being re-issued in cassette format. He early established a partnership with W. W. H. Gunn of Canada. In 1985, with the Cornell Laboratory of Ornithology, Borrer and Gunn produced "Warblers," one of the finest documentations of the vocalizations of a related group of birds, and the last production for two great recordists.

Though productive and influential with both

his own work and that of students in two scientific fields, Dr. Borror was a private and retiring person. He preferred to spend his time in the field collecting or in the laboratory organizing, analyzing and describing his collection. Retirement did not slow his work. To the contrary, his recording activity tripled thereafter. Borror's last work was a paper on the song of the White-eyed Vireo (Wilson Bull. 1987). His other love was not neglected as he was in the process of a sixth revision of the insect textbook. The curiosity that led him to use the newest technology in 1947 was evident in the spring of his death in 1988 when he requested that I use what was to him the "magical" new "Digital Speech Processor" (a digital audiospectrograph) to manipulate a White-eyed Vireo song in order to produce a test tape. He intended it for a playback experiment to determine the relative importance of song components in communication.

Borror suffered a mercifully short illness in April. He had come to the BLB to check on the

progress of the DSP Sona-graph installation just two weeks prior to his hospitalization. He was still looking forward to another field season at a favorite spot in southern Ohio. Though severely ill, he remained alert. One of his last requests of me was to play for him the White-eyed Vireo test tape. Dr. Borror is survived by his son, Dr. Arthur C. Borror of the Department of Zoology at the University of New Hampshire, two grandchildren and a great grandchild.

After his death I went to his personal files, as he instructed I should. True to his sense of organization, he had left a complete biography written in the third person; it was useful. However, the time spent with Don in the laboratory and the field gave me a far better view of this man's intellect, his prodigious memory and keen analytical mind.

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