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Editorial

The evolution of animal communication

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Communication is a central part of social behaviour, often directly affecting an individual's fitness. As such, the study of animal communication has become a central focus of animal behaviour researchers. It is a field that integrates a broad and diverse range of biological disciplines, from neurobiology and biomechanics to evolution and psychology, and over the years it has attracted a broad range of researchers as well. The contributors to this Special Issue of *Behaviour* on the evolution of animal communication exemplify this breadth and diversity of interests.

Animals produce signals for a variety of reasons, including advertisement and conflict resolution, and in turn they must make decisions based on the information they gather from the signals of others. Indeed, it is their role as respondents which puts selection pressures on signallers and their signals. Communication requires an individual producing a signal, a transmission channel (the environment), and individuals receiving the signal and extracting information from it. Any such process of information transfer is bound to involve errors, due to signal degradation, external noise, or receiver perception and decision rules. Thus, the broadcast information inevitably differs from the information a receiver uses for decision making. Animals can never acquire perfect information about their environment, and this uncertainty also applies to communication. There is no communication without errors. Or, to say it in the words of Haven Wiley, "communication is optimal but not ideal".

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Figure 1. Haven Wiley at the Mason Farm Biological Reserve in Chapel Hill, NC, USA, where much of the research by him and his students has been carried out. This figure is published in colour in the online edition of this journal, which can be accessed via http://booksandjournals.brillonline.com/content/1568539x.

For over 40 years, R. Haven Wiley's theoretical and practical contributions to the study of animal communication and its constraints have been immeasurable. Haven has followed a diverse array of research lines during his career, but all have been driven by his eagerness to understand the basic principles of communication and the evolution of communication systems. The mating systems of grouse (Wiley, 1973, 1974, 1991), dominance interactions of sparrows (Wiley et al., 1999), cooperative breeding of tropical wrens (Wiley & Rabenold, 1984), and vocal communication of anurans (Wollerman & Wiley, 1982) and especially song birds (Wiley, 2013a) are just a few topics where his contributions have had major scientific impacts. In particular, his in-depth reviews of the theory underlying behaviour and communication have been widely influential (Wiley & Richards, 1978, 1982; Waser & Wiley, 1980; Wiley, 1994, 2006; Wiley & Poston, 1996).

Yet, Haven's influence has been much broader than his publication list suggests. As a research mentor, Haven was one of those rare, non-self-promoting scientists who routinely emphasized to his students that their PhD projects were their own. As a consequence, only in exceptional cases did he include himself as a co-author on his students' publications, even publications in top-tier scientific journals (Godard, 1991). Thus, many of his

Figure 2. Contributors to the symposium in honour of Haven Wiley at the 49th Annual Meeting of the Animal Behavior Society in Albuquerque, NM, USA. From left to right: Bernie Lohr, Don Dearborn, Barbara Ballentine, Jeremy Hyman, Steve Nowicki, David Westneat, Dana Moseley, Jordan Price, Haven Wiley, Marc Naguib and Bill Searcy. Contributor not in photo: David Luther. This figure is published in colour in the online edition of this journal, which can be accessed via http://booksandjournals.brillonline.com/content/1568539x.

intellectual contributions are published without his name. This special volume is dedicated to Haven Wiley's many 'unsung' contributions to the study of animal communication.

To celebrate Haven's recent retirement from the University of North Carolina at Chapel Hill, we organized a symposium at the 49th Annual Meeting of the Animal Behavior Society in Albuquerque, NM, USA. A number of his former students and long-term colleagues were invited and this Special Issue includes contributions by many of them. We include review articles addressing constraints in communication (Diep & Westneat, 2013; Luther & Gentry, 2013; Naguib, 2013; Price, 2013; Wiley, 2013b), as well as articles with original data on the coding and decoding of information on motivation and aggression (Ballentine et al., 2013; Hyman et al., 2013; Lohr et al., 2013; Reichard et al., 2013; Searcy et al., 2013; Moseley & Wiley, 2013). The articles in this issue are as diverse as are Haven's interests.

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