

Preface

Central to the notion of communication is the reception of information through a stimulus that an organism perceives from the external environment.

Peter Marler (1967, p. 769)

[W]e prefer to avoid the very idea of information, whether true information or false ... [T]he traditional views of the functions of communication – transmission of information as to species, sex, breeding condition, etc. – are pitifully inadequate to account for the musical elaboration of bird song ... Oratory is unnecessary if the purpose is simply to convey information.

Richard Dawkins and John Krebs (1978, pp. 304 and 308)

This book is about a familiar view in animal behaviour studies: the idea that animal communication is a matter of conveying information. On this view, interacting animals are construed as senders, who emit signals that carry information, and receivers, who pick up the information in order to guide their behaviour. Communication systems as diverse as the waggle dance of honeybees, the alarm calls of vervet monkeys and the light pulses of fireflies are all regarded as sharing the same basic means of regulating behaviour. That is, animals respond to signals in certain ways because the signals carry useful information: worker bees fly to a particular location because the dance informed them about the whereabouts of a valuable resource, vervet monkeys hide in a bush because the alarm call signalled an approaching eagle and so on. This is the view that Peter Marler's remark encapsulates so well. But it has not gone unchallenged. Some 30 years ago, Richard Dawkins and John Krebs suggested banishing the information concept from the study of animal communication. Since then there have been occasional calls for replacing, or at least supplementing, information with concepts such as manipulation and influence.

One motivation was the thought that information is, at bottom, merely an empty metaphor, and a harmful one at that. More recently, when the preparations for this volume were already under way, this lingering tension came to the fore and attracted wider attention.

The criticisms of the information view raise some fundamental questions about the study and nature of animal communication. How are concepts such as 'information' and 'meaning' employed? Which theoretical roles are they meant to play? Do they live up to these roles? Do they adequately conceptualise animal communication and, if so, to what extent and why? And ultimately: what do information, reference and meaning consist in? Do these phenomena feature in interactions between animals? Similar questions can be asked of the purported alternatives: manipulation, persuasion and influence.

The goal of this volume is to address these issues head-on and, more broadly, to improve our understanding of the conceptual and methodological foundations of animal behaviour studies. The volume aims to achieve this goal in several ways. First, it brings together key proponents and opponents of the informational approach, offering an opportunity to engage directly with the arguments, for example by means of peer commentaries to individual chapters. Second, it broadens the way in which the topic is addressed by considering advances in related fields, such as the neuroscience of signal processing, signal evolution, the relation between animal signals and human language, and statistical decision theory. Third, it adds a philosophical point of view. Inviting philosophers to the table may strike many practitioners as a risky move. The concern may be that it blows out of proportion moderate, and as some believe insignificant, disagreements, engulfing the topic in unproductive sophistry. However, I believe that philosophy has specific and valuable resources to offer. Theories of information, for instance, can help articulate what information is, or plausibly could be, and what role it might play in animal communication.

A few remarks about the structure of this book. The Introduction is intended for readers who are new to the topic. It surveys informational and non-informational approaches to animal communication and sketches some philosophical concepts and distinctions. The 18 chapters are divided into five parts.

Part I explores the key notion of information. Horn and McGregor use the perspective of communication networks to operationalise information. Scarantino defends a probabilistic theory of information and applies it to animal communication. Kight, McNamara, Stephens and Dall recommend the use of statistical decision theory in order to understand signalling. Wiley defends both qualitative and quantitative notions of information. Millikan advances a solution to the reference problem for probabilistic theories of information.

Part II subjects the information concept to criticism and advocates alternative approaches. Rendall and Owren bolster and extend their previous criticisms with doubts about current views of human language and communication. Sarkar challenges the utility of both qualitative and quantitative notions of information in explaining animal signalling. Morton and Coss, and the late Professor Owings, argue that information is an empty metaphor, best replaced with a 'management' approach. Ryan focuses on sexual communication to argue that informational explanations are impoverished.

Part III addresses the topic from the point of view of specific case studies, which range from insects and birds to meerkats and monkeys. Horisk and Crocroft consider vibrational communication in treehoppers and conclude that information transfer is optional. Botero and de Kort argue that manipulation cannot adequately explain song consistency in birds. Fischer explores the attractions and limits of understanding primate vocal communication in terms of information. Allen uses work on meerkats to defend the informational approach. Christison-Lagay and Cohen review how primates process the vocalisations of conspecifics at the neural level and stress the activation of multiple brain areas.

Part IV provides an evolutionary perspective on animal signalling. Lachmann ties quantitative information measures to fitness consequences. Godfrey-Smith explores the properties of sender-receiver systems at equilibrium and concludes that information and influence are complementary.

Part V explores the relation between animal signals and human language. Adams and Beighley regard animal communication as a matter of information transfer and reserve meaning for human languages. With a view on evolutionary linguistics, Scott-Phillips and Kirby propose an inferential model of communication that revolves around influence as its basic component.

The idea for this volume was hatched in 2008. It was part of a grant application to the British Academy for a project on informational and non-informational approaches to animal communication (SG-51996). I gratefully acknowledge the Academy's support. It allowed me, among other things, to visit Carel ten Cate, Lars Chittka, Rufus Johnstone and Nick Davies, and to hold conversations with Eugene Morton, Donald Owings, Michael Owren, Drew Rendall and Klaus Zuberbühler. Their patience and openness greatly helped me to better understand animal communication and prepare this book, for which I am very thankful. I would also like to thank the authors of this volume for their willingness to participate in a joint project, about which some have strong views, and to expose their chapters to public peer commentary. The external reviewers provided invaluable and constructive feedback on the individual chapters. For this I am indebted to Dorit Bar-On, Michael D. Beecher, Carl T. Bergstrom,

Guiseppe Boncoraglio, Jack W. Bradbury, Gordon M. Burghardt, Matthew Campbell, Rosa Cao, Erica A. Cartmill, Sarah Collins, Torben Dabelsteen, Hilmi Demir, Stephen M. Downes, Simon Fitzpatrick, Patrick Forber, Todd Freeberg, T. Ulmar Grafe, Justin Garson, Steven Hamblin, Anne Leonard, Ola Olsson, Jessica Pfeifer, Carolyn Price, Rafael L. Rodríguez, Gregg Recanzone, William A. Searcy, Nicholas Shea, Andrew D. M. Smith, Mitchell Steinschneider, Robert M. Seyfarth, Brandon C. Wheeler and three reviewers who preferred to remain anonymous. Special thanks are owed to the ever-encouraging Jack Bradbury, who provided extensive comments on a range of issues, especially statistical decision theory, and gave valuable advice in preparing this volume. I am also very grateful to Robert Seyfarth for sharing, despite some reservations, his immensely constructive suggestions. Any remaining shortcomings are, of course, my responsibility. I thank my colleague Nathaniel Jezzi for stylistic suggestions, as well as Martin Griffiths and Lynette Talbot from Cambridge University Press for their guidance through this project, and Lindsay Nightingale for her superb copy-editing.

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