Analyzing Animal Societies: Quantitative Methods for Vertebrate Social Analysis

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Beyond Fission-Fusion

Analyzing Animal Societies: Quantitative Methods for Vertebrate Social Analysis. Hal Whitehead. University of Chicago Press, 2008. 320 pp., illus. $29.00 (ISBN 9780226895239 paper).

The intended purpose of *Analyzing Animal Societies: Quantitative Methods for Vertebrate Social Analysis* is made clear in the title—it aims to assist biologists studying social structures held to be synonymous with social systems, social organization, and society. This purpose is further clarified in three key words of the subtitle. The emphasis is on quantitative approaches and analysis, and the subjects are vertebrates (mainly mammals, although birds and, to a lesser extent, fish also get a look). The reason for the focus on higher vertebrates is pragmatic rather than exclusive; interactions between identifiable individuals are central to the approach, and most studies of invertebrate social behavior do not identify individuals.

Hal Whitehead is a research professor in the Department of Biology at Dalhousie University, Halifax, Nova Scotia. However, I am sure that Whitehead would consider *Balaena* (his research sailboat) to be at least equally important as his land-based place of work. Researching such an astonishing study species as the sperm whale *Physeter macrocephalus* in exotic oceanic locations from a sailboat has made Whitehead the envy of many desk-bound biologists. If such work is not quite the stuff of legend (and it must be a close call), you still cannot help feeling that there is a movie in the *Indiana Jones* genre waiting to be shot. But that sort of Hollywood stereotype obscures the reason that Whitehead is held in high regard by a wide range of biologists: his work has consistently pushed forward our understanding of cetacean social structure. That he has been able to do this with ocean-roaming mega mammals leaves one wondering what he would be able to do with more tractable species. His book *Analyzing Animal Societies: Quantitative Methods for Vertebrate Social Analysis* gives hints and examples that partly answer this question and, more important, it should provide a stimulus to those studying such species.

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This is a book about fundamental methods of social analysis; as such, it covers the essential technicalities of analysis, including collecting data and using them to describe relationships and to model social structure. It then takes the natural next step of using this information to compare societies and to discuss the direction of cause-effect arrows in relation to social structure.

The approach adopted in *Analyzing Animal Societies* is based on a conceptual framework of social structure from an ethological perspective set out by R. A. Hinde in 1976 ("Interactions, Relationships and Social Structure," Man 11: 1–17). The foundation of this approach is the interaction, defined as when the presence or behavior of one individual affects, or is directed toward, another individual. This focus on interactions between known individuals requires their identification by the observer and results in the taxonomic limitation to vertebrates.

The approach is also essentially dyadic, and while a dyad of two interacting individuals is the obvious practical starting point, I am concerned that this will limit the approach. The potential for limitation is best explained by drawing parallels with animal communication. Such parallels are close because communication underlies many important interactions. Traditionally, communication has been considered to be dyadic, often with one individual as a signaler and one as a receiver. However, there are many reasons to consider that communication occurs in a network of several signalers and receivers, and such considerations have identified additional communication roles, such as eavesdropping. The advisability of the focus on dyads in the approach is briefly discussed in the context of the network analyses emerging from physics and the individual-based social niche approach. These are rapidly changing areas of research, and I would expect a second edition to incorporate such approaches.

But to return to Hinde's perspective, the relationship between the individuals is characterized by the content, quality, and patterning of interactions, and social structure is the aggregation of relationships in relation to the type and patterning of relationships. The approach appears straightforward—record the interactions of identified individuals and characterize these interactions and their aggregation into relationships. The bulk of *Analyzing Animal Societies* guides the reader through the techniques required to do this and describes the resulting analytical challenges. The layout of the text aids the journey: there is an explicit (and explained) structure of headings and subheadings to clarify the thread of argument. The numerous figures (often enhanced with line drawings of the study species), tables, and text boxes (which contain detail or elaborations) are also key features of the layout that help understanding. The prose is clear, readable, and concise, almost to the point of abruptness at times. However, the information is there, in text boxes, appendices, and glossaries.

But make no mistake: this book takes no prisoners. It will be a challenging read for many who are directly involved in this field of research. It may be daunting enough even to dissuade potential students from the notion that studying vertebrate social structures is a pretty neat idea (especially if megafauna, oceans, and sailboats are not on the menu). I suspect I'm not alone in wishing while reading the book that I'd paid more attention during math and stats courses. But *Analyzing Animal Societies* will amply reward those who take up its challenge. Contrary to the publisher's blurb on the back cover, this book will not give studies of vertebrate social behavior a "kind of quality standard." It will do something far more important: it will give much needed quantitative insights into vertebrate social structures. In so doing, it will help the field to move on from the use of qualitative descriptive labels, such as the ubiquitous (and therefore ultimately unhelpful) phrase "complex fission-fusion societies." I hope many readers are motivated to take up the challenge.

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DOES NATURE STAND A CHANCE IN A HUMAN-DOMINATED WORLD?

The World's Protected Areas: Status, Values, and Prospects in the Twenty-first Century. Stuart Chape, Mark D. Spalding, and Martin D. Jenkins, eds. University of California Press, 2008. 376 pp., illus. $54.95 (ISBN 9780520246607 cloth).

With more than 100,000 protected areas now covering nearly 12 percent of Earth's land surface, it is timely to have an overview of how protected areas are doing, what the geographical variations may be, and what challenges remain. *The World's Protected Areas: Status, Values, and Prospects in the Twenty-first Century* intends to provide such a global overview. Its three editors, all of whom have been associated with the World Conservation Monitoring Centre in the United Kingdom at one time or another, draw on expertise from all parts of the world to give the book outstanding authority. The book provides an authoritative perspective on the numbers, extent, and types of protected areas. It also offers an introduction to the multiple approaches to managing protected areas in various parts of the world, examines the critical role of protected areas in conserving global biodiversity, and gives a reasonable indication of where gaps remain in the global network of protected areas (especially in the marine environment).

Even though these numerous areas are under legal protection, virtually all of them face significant threats, including human settlement and incursion, changes in fire regime, the development of infrastructure such as dams and roads, the growth of tourism and recreation (very much a mixed blessing), resource extraction (from mining operations and wildlife poaching, e.g.), the impacts of nonnative species, and climate change—one threat that will certainly affect all of the others just enumerated.

The World's Protected Areas reflects the latest thinking about protected-area management, recognizing, for example, the importance of developing more sensitive relationships with people living in and around the protected areas. Indigenous peoples often feel aggrieved when protected areas are established on lands traditionally considered to be their ancestral domain, but some countries are finding ways of ensuring that indigenous peoples earn their fair share of the benefits that accrue from the establishment of protected areas.

The obvious way to respond to the challenges that protected areas face is to improve the effectiveness of management. To this end, the book usefully examines the various approaches that are being applied around the world, in the marine environment as well as on land. The coverage of all of these topics is relatively brief and presented in language the nonspecialist can easily understand. All of the introductory chapters are well illustrated with photographs, tables, and boxes, making the overall package extremely attractive. The photographs are invariably of very high quality.

As the human population soars toward nine billion and pressures on natural resources intensify, it will become increasingly important to ensure that protected areas are well managed and strongly supported by the general public. Books like The World's Protected Areas *will help to justify the necessary investments.*

The second half of the book is devoted to a regional perspective on protected areas, broken down by country or island. Nearly 120 contributors helped to ensure the authority of these regional overviews. Each of these passages tends to be relatively brief, however, and the maps are impressionistic rather than literally accurate—North America, for example, occupies only a single page, and it appears as if most of the western United States is a giant protected area. But the maps also help to illustrate, among other important facts, that many protected areas are located on sensitive national borders, and a large number of protected areas are in biologically rich mountainous terrain. Still, the maps can sometimes be slightly misleading, as in the case of Ukraine: the map seems to indicate that about half of the territory consists of protected areas, while the actual figure is only around 3.5 percent. The fact that this 3.5 percent comprises almost 5200 protected areas suggests that most of those areas are too small to be well mapped at the scale adopted for *The World's Protected Areas.* It is up to the reader to calculate that Ukraine's protected areas average only about 4.3

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