

and facilitate group living and extreme sociality – hardly a surprise for those familiar with Dunbar's work – and many aspects of this hypothesis are covered. These two underlying themes serve as a tool to not only link somewhat disparate topics throughout the book, but also as a means to highlight the far-reaching implications of our ability to understand intentionality.

It is in the discussion of uniquely human traits where *Evolutionary Psychology* begins to show the signs of a maturing field of evolutionary theory as applied to humans and attempts to stretch behavioral ecology to accommodate our more unique features. The attention to these unique aspects of the human species, including language and large-scale cooperation, is welcomed. Also noteworthy are the re-emergence of group-level models and the introduction of niche construction theory. The latter, which is the idea that ecology influences behavior and behavior in turn influences ecology, is an interesting and intuitively obvious idea but one that seems difficult to operationalize. And, similar to the current state of the field, although multi-level selection theory is promoted, there is a tension throughout *Evolutionary Psychology* between individual-level models and group-level models that is never wholly resolved.

The strengths and weaknesses of the book, as well as of the field itself, lie in its interdisciplinary leanings and seemingly limitless range of research topics. Indeed, the title seems somehow too narrow given the breadth of topics and disciplines surveyed. It is clear that the authors were faced with their own allocation decision, and the outcome of this quality–quantity tradeoff occasionally robs some areas of depth and, ultimately, results in a variable covering (which might simply reflect the availability of relevant studies but leads to some frustration). Some topics are quickly dismissed, such as the interesting idea that language might partly have evolved as a sexually selected trait, and others are absent, such as the work of Gigerenzer and Todd's group on 'simple heuristics.'

But any 'beginner's' book is going to miss some areas, especially in a rapidly growing field, and the authors do exceptionally well what they intended to do: pique the reader's interest and show that evolutionary theory has tremendous explanatory power, even in a big-headed, prosocial, mind-reading, talking primate.

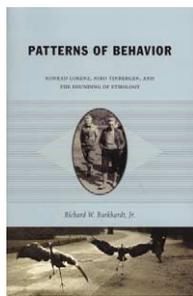
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## Of gulls, geese and two men

**Patterns of Behavior: Konrad Lorenz, Niko Tinbergen and the Founding of Ethology** by Richard W. Burkhardt Jr. University of Chicago Press, 2005. US\$80.00/US\$29.00 £56.00/£20.50 hbk/pbk (xii + 636 pages) ISBN 0226080897/0226080900

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Every other year, up to a thousand animal behaviour researchers discuss their results at 'International Ethological Conferences', a tradition that was begun during the early 1950s by co-workers of the Austrian zoologist Konrad Lorenz and his Dutch colleague, Niko Tinbergen. The breadth of themes covered demonstrates impressively the integrative

nature of what is still a young scientific discipline. As well as many other annual and biannual meetings, several scientific journals are also devoted to the study of animal behaviour and enjoy an ever-increasing popularity. Ethology – a story of progressive successes?

This question pops up repeatedly in Richard Burkhardt's extensive treatise of the history of ethology. With the 1973 Nobel Prize laureates Konrad Lorenz and Niko Tinbergen as its founders and key actors, the first hundred years of ethology as a coherent biological science unfold before the reader's eyes. Ethology was baptized by the

American zoologist Morton Wheeler in 1902, long before the actors responsible for developing the field took to the stage. He proposed the term 'ethology' for the 'study of animal instincts, intelligence, habits and habitus'. However, it was not until the 1930s that Lorenz' work on the species-specific action patterns of birds, and his demonstration that behaviour can be used as 'morphological structures' to reconstruct phylogenies, gave the field its conceptual foundations. The comparative aspect marked one of the original hubs of this new biological study of behaviour. Another new aspect was the focus on naturally occurring behaviour patterns in more or less natural situations.

Burkhardt devoted 25 years to unravelling the social, political, scientific and also the personal situations and dispositions of individual scientists responsible for the development of the field. He describes, for example, how the Second World War and its political foundation influenced the development of ethology, particularly because of Lorenz' obscure associations with Nazi ideology early in the Third Reich. The explanation of postwar reconstruction of ethology as a discipline covers two of the 11 chapters of the book, illustrating the importance of 'ethology's ecologies' as Burkhardt calls it.

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Lorenz and Tinbergen were very different people, with different backgrounds and scientific approaches. Tinbergen viewed ethology as the science ‘applying physiological methods to the objects of animal psychology’, focusing on the issue of behavioural causation. He was the naturalist with a strong analytical and experimental approach who tried to coordinate and structure ethology as a coherent scientific discipline, matching ranks with other branches of contemporary biology such as physiology, morphology and systematics [1]. Lorenz, in Tinbergen’s words, was by nature more of a visionary – an intuitive interpreter rather than an experimental verifier. His most important contribution was to design ethology as a biological science in the first place, and to call the attention of zoologists to the scientific explanation of behavioural phenomena. Both preferred to use birds as their model organisms, with ducks and geese being Lorenz’s passion and Tinbergen focusing mainly on gulls, which explains why ornithologists were their earliest audience. Both wished to understand underlying mechanisms of behaviour patterns and life processes. And both were exceptionally able to attract disciples to the field.

But whereas Tinbergen increasingly came to feel that work on survival value was what suited him best, Lorenz had never taken this issue into the field. In his textbook on ethology published in 1978, Lorenz grumbled that ‘ethology was like a coral, its branches losing contact with their foundation’ [2]. Tinbergen, instead, had continued to develop the field and remained its core actor for much longer. He added to Julian Huxley’s rather sloppily formulated ‘three major problems of biology’: causation, survival value and evolution, a fourth one: ontogeny. His conviction was that ethology needed to give equal attention to each of these questions and to their integration; his biggest worry was that the field might split up ‘into seemingly unrelated sub-sciences.’ His most long-lasting

effect on behavioural research was his focus on the survival value of behaviour patterns, which spawned ‘behavioural ecology’ as a discipline. This research field has taken off over the past three decades of the 20th century and is often assumed to exist somewhat independently of ethology, despite being only one branch of the tree developed by ethologists over the preceding decades.

Not knowing one’s roots is a common mistake in the early development of scientific disciplines, a problem that Burkhardt’s thoughtful, comprehensive and readable book should help to resolve. It should be read by all animal behaviour researchers to help put their own efforts into perspective. As Marian Dawkins put it, ethology is a ‘science with its eyes on both, the long term and the short term, on evolution and mechanism’ [3]. This must not be forgotten if the scientific study of behaviour is to remain the successful enterprise that it has proven to be during its first hundred years. The last picture of the many authentic black and white photographs of this book nicely represents the programmatic nature of the book for ethology as a field. It shows footprints disappearing somewhere in an indefinite background – Tinbergen’s photograph of fox tracks in the dunes. Whither ethology [4]?

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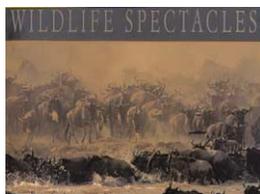
## Spectacular animal congregations

**Wildlife Spectacles** by R.A. Mittermeier, P. Robles-Gil, C.G. Mittermeier, T. Brooks, M. Hoffman, W.R. Konstant, G.A.B. da Fonseca and R.B. Mast. CEMEX- Agrupación Sierra Madre-Conservation International, Mexico, 2003. US\$50.00 hbk (324 pages) ISBN 968 6397 72 8

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Biodiversity conservation requires sound scientific information to guide various policy approaches, including: raising public awareness of its existential, functional and economic value; the establishment and maintenance of natural protected areas (plus compensation to local owners willing to set aside, for conservation,

lands that would otherwise be used in another ‘productive’ way); and promoting (and making economically attractive) the preservation of biodiversity outside protected parks. Simply put, society needs to apply the best scientific information to attempt a better ‘management’ of ecosystems and the services that they provide. Evidently, this goal requires major internationally coordinated management efforts in which new and educated citizen attitudes and institutions will have a central role [1]. The conservation of global biodiversity is a collective Herculean endeavor, but local action on all fronts is also urgently

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Richard W. Burkhardt Jr. is professor of history at the University of Illinois at Urbana-Champaign. He is the author of *The Spirit of System: Lamarck and Evolutionary Biology*. Ethology has been variously defined as the study of the biology of behavior and the examination of full patterns (rather than fragments) of behavior under natural conditions. It importantly supplemented the American tradition of behaviorism with its isolation of individual actions under strict experimental control, thus losing much of the richness of behavior as it occurs in the natural world. The combined evolutionary, developmental and immediate causal processes in behavior, along with a concern for the functions that behavior serve have been the hallmarks of ethological research as clearly e RICHARD W. BURKHARDT, JR, *Patterns of Behavior: Konrad Lorenz, Niko Tinbergen, and the Founding of Ethology*. Chicago and London: University of Chicago Press, 2005. Pp. xii+636. ISBN 0-226-08089-7. RICHARD W. BURKHARDT, JR, *Patterns of Behavior: Konrad Lorenz, Niko Tinbergen, and the Founding of Ethology*. Chicago and London: University of Chicago Press, 2005. Pp. xii+636. ISBN 0-226-08089-7.