

*The Tinbergen Legacy*. Edited by M. S. DAWKINS, T. R. HALLIDAY & R. DAWKINS. London: Chapman & Hall (1991). Pp. xii + 146. Price £25.00.

This slim collection of essays by eight of Tinbergen's students, colleagues and intellectual descendants provides a brief but compelling glimpse of Tinbergen the man in the course of discussing the major contributions of Tinbergen the scientist.

The first chapter (by Baerends) traces in broad outline Tinbergen's life in science. The last (by Shaffer) chronicles his work as a wildlife photographer. Authors of the intervening six chapters are concerned with Tinbergen's approach to specific problems in animal or human behaviour and, often, with the changes in understanding of those problems that have occurred during the last two decades. Davies considers Tinbergen's studies of behavioural adaptation, then uses recent investigations of the functions of helping at the nest to explore changes in interpretations of social behaviour that occurred as ethology developed into behavioural ecology. Huntingford reviews both classic ethological conceptions of the internal organization of mechanisms controlling behaviour (especially aggressive behaviour) and recent developments in studies of motivation. Krebs considers, first, the Tinbergen/Lorenz view of communications, then the striking changes in communication theory that have taken place during the past 15 years. Robinson describes Tinbergen's use of comparative methods in behavioural research and describes recent studies in tropical biology demonstrating the importance of comparative research for understanding both the function and evolution of behaviour. Two further chapters, one by Hinde, the other by Delius, discuss ethological contributions to the study of human behaviour.

As one might anticipate, continued work on many of the problems that Tinbergen addressed has produced impressive advances in understanding. Consequently, details of work carried out in the 1950s and 1960s have become less obviously relevant to students of animal behaviour with each passing year. Yet, at a deeper level, as the various chapters in *The Tinbergen Legacy* make clear, Tinbergen's contributions still form much of the foundation of the field of animal behaviour. His introduction into a largely observational and interpretive ethology of experimental and ecological methods, his clear statement of the four questions and compelling demonstrations of the contribution of answers to each to understanding behaviour have irreversibly shaped the field.

In an autobiographical essay, Tinbergen (1985, page 455) expressed his concern 'that the younger

generation has already forgotten the early work that paved the way for their present ideas . . . that so few young colleagues see the continuity in the history of ethology'. *The Tinbergen Legacy* makes that continuity explicit, providing those who never had the opportunity to interact directly with Tinbergen an overview of the contributions, both personal and professional, that were Tinbergen's gifts to us all.

BENNETT G. GALEF, JR

*Department of Psychology,  
McMaster University,  
Hamilton, Ontario L8S 4K1, Canada*

### Reference

Tinbergen, N. 1985. Watching and wondering. In: *Leaders in the Study of Animal Behavior* (Ed. by D. A. Dewsbury), pp. 431-464. Cranbury: Associated University Press.

*Experimental Analysis of Behavior*. Parts 1 and 2. Edited by I. H. IVERSEN & K. A. LATTAL. Amsterdam: Elsevier (1991). Pp. 724. Price \$295.00 hardback, \$97.50 paperback.

Ethologists and behavioural ecologists be warned: this two-volume work is dedicated to B. F. Skinner. So, for 'Experimental Analysis of Behavior' read 'Operant Conditioning'. Given this caveat, the 15-multi-authored chapters constitute a comprehensive guide to the art, very much from a practical rather than a theoretical stand-point. They constitute volume 6 in the series '*Techniques in the Behavioral and Neural Sciences*'.

Part 1 mainly deals with methods. Chapter 1 by Nancy Ator covers choice, care and maintenance of both experimental subjects and equipment. The lists of suppliers at the end of the chapter will be of use to North American scientists. Suzanne Gleeson covers response acquisition, noting that for most behaviourists this is essentially part of the pre-experiment setting-up process, rather than an object of study in itself. Historically, it is steady-state behaviour that has received most attention. Gleeson's chapter thus focuses on how to get your animal to perform the response, be it lever-pressing or key-pecking, that will form the dependent variable in your study. Chapter 3, by Kennon Lattal, deals with the various schedules of positive reinforcement that can be used (e.g. fixed interval, progressive ratio), how to program them, and the characteristic pattern of response on each. Baron, in chapter 5, does a similar job on avoidance and punishment. Chapter 4, by Michael Perone, covers experimental design. As a behavioural ecologist, I found this particularly interesting, not so much for