

## REVIEW

L. van der Hammen, *Unfoldment and Manifestation: Seven essays on evolution and classification*. The Hague, Netherlands, SPB Academic Publishing, 1988, vii+181 pp.

*Unfoldment and Manifestation* purports to offer a new theory of evolution and classification. It is the latest of a number of recent books that claim to offer alternatives to more orthodox neodarwinian explanations for patterns of evolution. Such authors often reject some parts of neodarwinism, and argue that other aspects of the prevailing evolutionary theory are of limited consequence. Natural selection is viewed as a strictly externalist approach to an examination of pattern in evolution. Some workers want to replace this externalist view, in which the environment is considered to draw out novelty and establish pattern through natural selection, with an internalist perspective, in which the focus is on principles of generation of morphology and on such phenomena as self-regulation, which are thought to be largely absent in selection theory. Often the methods and perspectives of structuralism are advanced as being useful for the development of explanations of process and pattern of evolution. We, too, find that structuralist perspectives can enrich evolutionary investigations; however, we reject the simplistic dichotomy of neodarwinism versus structuralism. Much of the interest in alternatives to neodarwinism derives from a focus on some narrow aspects of neodarwinism, and from an admirable effort to expand consciousness and perception in evolutionary investigation. But the false dichotomy that is frequently drawn does little to advance the field as a whole. A critical examination of Darwin's body of work reveals that some of the ideas now considered to be absent from current neodarwinism (dominated by workers in the fields of genetics, ecology and behavior) were central to his arguments (for example, the evolution of complex structures, the nature of parallel evolution, and the unity of type).

Structuralism (which in biology emphasizes generative principles, the relation between parts and wholes, generative principles, and self-regulation) arrived late to evolutionary biology, despite the fact that Piaget, one of its principal advocates, was trained as a biologist and had strong interests in development. Van der Hammen often is cited as a prominent exponent of the incorporation of structuralist principles into biology; accordingly, we looked forward to reading this volume. We hoped that a truly general account, illustrated by exact examples from a large group of organisms, would be available. Regrettably, this book will not serve as a primer or even as a particularly useful example of the methods advocated by structuralists. Instead, it is a collection of seven essays, and almost everything in the book has been published elsewhere. What is new here is a generally useful introduction, some updating and correcting of previous publications (several of which were presented in this journal), and some new conclusions.

The first essay deals briefly with general issues in evolutionary biology and the history of evolutionary thought. Three models of evolution are discussed: the Lamarckian Model, the Darwinian Model, and a third model, said to originate with Teichmüller, an obscure, nineteenth-century philosopher (obscure at least to English-speakers; his name appears in neither the 11th (1911) nor the 14th (1974) editions of the *Encyclopaedia Britannica*). Van der Hammen views with favor some aspects of

the Larmackian Model, especially what he terms internally directed evolution. His brief overview of the Darwinian Model is concluded by stating that neodarwinism has become of minor importance, but because of the obscurity of his writing style we do not know if he means this as a general condemnation of neodarwinism (which we assume to be the case), or only of chromosomal evolution. Van der Hammen will not win many converts, whatever he intends to say. Teichmuller's Model seems to us to be just one more in a long line of evolutionary models that involves saltation (van der Hammen seems to be saying that Teichmuller's approach was outlined in modern form by Van Waesberghe in this journal in 1981). As van der Hammen proceeds into his development of this "third model" of evolution, in this and subsequent chapters, it becomes clear that structuralist principles are very important in his thinking. We have sympathy for application of structuralist approaches in evolutionary biology, so we read this section of chapter I (and, in addition, particularly chapter IV) with interest. However, we both admit to finding his conception obscure -- independently! The headings of the three subsections in Chapter I on "Further development of the third model" illustrate this obscurity: "aspects of manifestation; gradual unfolding and the stages of evolution; systems of interactions, vital field, and the implicate order".

Van der Hammen is a major contributor to taxonomy and morphology of the Chelicerata, and these organisms are used to illustrate his approach. While exact examples are indispensable to clarify evolutionary arguments in many instances, van der Hammen's presentations are very difficult to follow, and in many instances aroused unanswered questions. A glossary would have been useful, for the terminology is daunting. He considers numerical changes in development and evolution of mites (Chapter II) and parallel evolution in chelicerates (Chapter III). He introduces us to such interesting concepts as 'vertition' (Chapter II), and a new approach to the type concept, higher classification and evolution (Chapter V). Yet, these ideas require clarification before they can be incorporated by most evolutionary biologists. The discussion of parallel evolution (Chapter IV) and its analysis is stimulating, yet fraught with problems. The author appears to recognize that a robust phylogeny is necessary for a structuralist analysis of lineages, but clearly this is not available for many groups under consideration. Lacking an explicit phylogenetic hypothesis, the author's many arguments concerning direction of evolution in chelicerates appear to the general reader to be simple assertions. The comments on evidence for homology are equally interesting, but would better be placed in the context of current thinking about these issues. The discussion of the structuralist approach (Ch. VI) generalizes from the previous chapters, but leaves many issues unsettled: for example, the nature of 'laws'; whether genotypic information is effectively unlimited; and what sets limits of form, structure, and development (the brief discussion of unrealized forms might also have cited work by Raup and by Hickman, in addition to Gould).

Van der Hammen deserves much credit for his clear identification of structuralism as a method applicable to a variety of disciplines, rather than a theory (though he notes that it is dependent on theoretical assumptions). He comments that "Relations at the level of observable reality are regarded as reflections of relations at the level of a structure below or behind reality; it is this 'deep' structure (acting as a structuring force) which structuralism attempts to discover." His realization that structuralism does not look for causal explanations, but that one of its main purposes is to prepare a complete inventory of structural relations of the organisms under study, is revealing. Van der Hammen characterizes his own structuralist approach in the study of evolution as a search for laws underlying the manifestation of evolution, exemplified by his work in four areas: numerical changes in chelicerate setal patterns, chelicerate life cycles, the evolution of appendages, and the transformation of form, as presented in this book.

yet, a major problem remains. Neodarwinists do not understand structuralism as applied in evolutionary biology. A clear exposition of the structuralist approach in modern terms, jargon-free, is badly needed if progress is to be made. Regrettably, this work does not provide it. For example, we wonder how many of the concepts presented can be applied methodologically, and how they can be quantified in a manner that provides comparative analysis. However, we recognize that there is much food for thought in these seven essays. While this volume does not really present a discrete thesis, we urge van der Hammen to write a more general book, using Chapter I as a precis. A more coherent, carefully developed approach will allow the community of evolutionary biologists access to a potentially progressive approach.

David B. Wake and Marvalee H. Wake  
Department of Zoology and  
Museum of Vertebrate Zoology  
University of California  
Berkeley, CA 94720