

SPECIAL PAPERS IN PALAEOONTOLOGY · 33

# Evolutionary Case Histories from the Fossil Record



THE PALAEOONTOLOGICAL ASSOCIATION

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EVOLUTIONARY CASE  
HISTORIES FROM THE FOSSIL  
RECORD

EDITED BY

J. C. W. COPE *and* P. W. SKELTON

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REFERENCES TO THIS VOLUME

It is recommended that references to the whole or part of this volume be made in one of the following forms, as appropriate:

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## PREFACE

OVER the past decade evolutionary studies have been stimulated by the appearance of papers, particularly from North America, in which models of evolutionary change have been proposed. In contrast with these more theoretical works, European palaeontology has long been preoccupied with fundamental detailed taxonomic work which in many cases has led to the formulation of evolutionary lineages for particular fossil groups. The Palaeontological Association felt that the time was opportune to marry this expertise in detailed taxonomic work with that on evolutionary models, to test the hypotheses about how evolution proceeds with actual data. It was thus that this Symposium on 'Evolutionary case histories from the fossil record' was conceived.

The papers were presented as part of the Association's Annual Christmas meeting (17–20 December 1983) held at the University College, Swansea. Some 170 members attended the meeting. The arrangement of the papers in this volume follows, with only minor changes, that of the meeting. Since only a few of the original contributions are not represented here, this published sequence still reflects the rationale behind that of the presentations. Systematic grouping of the contributions, with its attendant danger of provoking narrowly confined discourse between specialists, was deliberately avoided. Rather, in keeping with the objective of the symposium—'the presentation and analysis of data bearing on models of how evolution proceeds'—the papers were arranged so as to form a logical sequence in relation to various aspects of evolutionary palaeontology. We hope that this will most efficiently serve the needs of the reader primarily interested in locating case histories relevant to any given evolutionary theme.

In broad terms, the first half of the volume concerns microevolution and the latter half, macroevolution, with the upward shift in perspective heralded by Kennedy and Wright. The first two papers set the scene by addressing methodological matters: that by Paul advises on the nature of the data that are available and that ought to be recorded in order to tackle questions about evolutionary relationships and modes of microevolution; Fortey's paper draws attention to the interpretative problems posed by the unequal status in relation to testing of the two much-debated polar palaeontological models for the origin of species—'gradualism' and 'punctuated equilibria'. The next six papers then furnish microevolutionary case histories from a variety of groups of organisms. That their conclusions—in the best British tradition of compromise—give equal support to both models, will, by this stage in the debate be no surprise to the reader. Given the differing natural histories and particularly modes of reproduction of different organisms, it would be odd indeed if their species originated according to a common pattern. But to look on these papers as a mere poll on behalf of these two by no means mutually exclusive models (each consistent with several different biological models for the origin and maintenance of species) would be to trivialize them.

For many groups the quality of their fossil record offers little scope for microevolutionary studies. Nevertheless, there remain macroevolutionary questions, concerning, for example, the relative roles of constraining factors in shaping the clade forms and morphological contents of phylogenies, and the controls on patterns of change in the diversity of whole biotas, which palaeontologists are singularly well equipped to tackle. Indeed, it is probably in relation to such macroevolutionary questions that palaeontology will eventually be seen to have played its most significant role in the study of evolution. The constraints upon, and the architectural potentialities of form, with their phylogenetic implications, are considered in the next five papers.

The final two contributions address the largest scale of evolutionary perception—the history of entire biotas in terms of diversity changes and taxonomic survivorship. Such analyses of the

evolutionary dynamics of taxa again illustrate the enormous potential for tackling macro-evolutionary questions offered by the fossil data base that palaeontologists have at their disposal—a resource that until recently has too often been overlooked by palaeontologists, who have perhaps been sidetracked by trying to keep up with the biologists in areas of evolutionary enquiry where the latter are considerably better equipped in terms of relevant data.

J. C. W. COPE  
P. W. SKELTON  
*Convenors*

## EDITORIAL

THE papers in this volume were all presented at the Symposium meeting in Swansea, although all have been subjected to the Association's normal refereeing procedure and have been modified to varying extents as a result of referees' comments. Some contributions to the Symposium are not published here; this includes some which have been, or will largely be, published elsewhere and thus appear here in abstract form only. The contribution by Professor Callomon is of considerably greater length than that by other contributors, but includes in large measure his talk 'Jurassic ammonites in time and space', which was the Association's 22nd Annual Address, given on 21 March 1979.

J. C. W. COPE  
P. W. SKELTON  
*Editors*

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