

Preface

The main unifying idea in biology is Darwin's theory of evolution through natural selection. This idea was put forward when the study of fossils was still in its infancy, so that little was known of the actual course of organic evolution; when few studies had been made of the geographical variation of animals and plants; and, most important of all, before the mechanism of inheritance was understood. Yet recent advances in these various fields have confirmed Darwin's ideas, and in fact can only be fitted together to tell a coherent story if the theory of natural selection is accepted.

In this book I have tried to explain the causes of evolution in terms of the processes of variation, selection, and inheritance which can be seen to occur among living animals and plants. Work in many different fields of biology is relevant to such an inquiry. Unhappily no one biologist can hope to be familiar with all these fields, and I am no exception to this rule. Yet it seemed worth while to attempt a book covering the whole subject of modern evolution theory. Many books have been written, mainly for specialists, covering particular aspects of the subject; some of these are listed in the bibliography. I hope the present book will be of value to the non-specialist in summarizing a set of ideas which, taken together, form perhaps the most important contribution yet made by biologists to our understanding of what the world is like and how it came to be like that.

That I have been able to make the attempt at all I owe mainly to those who were first my teachers and are now my colleagues at University College London. As an undergraduate

I had the good fortune to attend Professor D. M. S. Watson's course in vertebrate anatomy, and learnt that the study of fossils, which in lesser hands can so easily degenerate into a tale of prehistoric wonders, can be made to reveal the way of life of animals now extinct and to show why evolution took the course it did.

In those sections of the book dealing with embryology and genetics, and particularly with the relations of these two subjects to each other, I owe a great deal to discussions with Dr D. R. Newth. To him, and to the many other colleagues whom I have plagued with questions I am most grateful.

But my greatest debt is to Dr Helen Spurway and to Professor J. B. S. Haldane, in whose department most of my research has been carried out. I have referred directly to some of their published work, but there are few subjects discussed in this book which I have not at one time or another also discussed with them, and from such discussions I have taken many of the ideas and examples quoted. If I have borrowed too many ideas from them without acknowledgement, I hope they will forgive me; in any case I feel certain that they are both sufficiently fertile of new ideas not to notice the loss.

The chapter dealing with palaeontology has been read in manuscript by Miss Pamela Lamplugh Robinson, and those dealing with speciation by Mr R. B. Freeman. The main part of the manuscript has been read by Professor Haldane and by Dr Newth. I thank them all for pointing out a number of errors, and for making many helpful suggestions. The mistakes which remain are my own. My thanks are also due to Mr W. B. Mackie for the care he has taken in preparing the diagrams.

Finally, a word to the reader about the principles I have tried to follow in writing this book. Before starting a formal training in biology, I had read a number of books about evolution, some intended primarily for specialists and some for laymen. Although there were always, in the former kind, passages which I could not follow, I found such books more satisfying than those written for laymen, since in the latter I had always the feeling that difficulties were being slurred over. I have tried to avoid this fault. Although I have not assumed any specialized

knowledge in the reader, and when possible have drawn my examples from familiar animals and plants, I have not omitted any subjects merely because they are difficult.

I am aware that there is therefore a risk that some parts of this book will prove rather hard going. This is most likely to be so in those sections which discuss the genetic aspects of evolution. People seem to be divided rather sharply into those who find Mendelian genetics easy, and those who find it incomprehensible. For the benefit of the latter, I have tried to concentrate the more difficult genetic arguments into a few chapters, which can be skipped by those with no taste for this kind of argument. But I hope that not too many readers will find this necessary.