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R. McNEILL ALEXANDER
Professor of Zoology, University of Leeds



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Preface

I have built this book from two of my previous ones, *The Invertebrates* and *The Chordates*. Together, they surveyed the animal kingdom (including the protozoans) in 1072 pages. This book covers the same ground in much less space. I believe that this shorter treatment will be found more suitable for modern university courses, which devote less time than older courses did to the structure and diversity of animals. I expect the book will be used mainly by undergraduates in their first or second year.

This book is about the major groups of animals, about their structure, physiology and ways of life. Each chapter, except the first, deals with a taxonomic group of animals, usually a phylum or class. Brief descriptions of a few examples are followed by more detailed discussion of selected topics. Some of these topics are peculiarities of the groups (for instance, the shells of molluscs and the flight of insects). Others are more widespread features or properties of animals which can be illustrated particularly well by reference to the group. Thus I have used jellyfish in chapter 3 to illustrate the workings of simple nervous systems, and have explained some of the basics of muscle physiology in my account of molluscs, in chapter 6. I have described many experiments because I think it as important and interesting to know how zoological information is obtained, as to know the information itself.

The diversity of animals is a major problem in writing about them. Any attempt at encyclopaedic coverage results in an enormous quantity of indigestible morphological and taxonomic information. I have tried to overcome this difficulty by omitting minor groups of animals, and describing only a few examples of each major group. I would rather give students a good understanding of typical examples of familiar groups of animals than tell them about obscure groups they may seldom or never see.

Though I have described rather few species, I want students to appreciate the extraordinary diversity of animals. That appreciation is better gained in the field and the laboratory, by studying specimens found locally, than by reading about animal diversity in books.

One of the main aims of zoology is to explain the structure and physiology of animals in terms of physical science. For instance, explanations of nerve conduction, swimming and skeletal strength depend on physical chemistry, hydrodynamics and materials science, respectively. I have used many branches of physics and physical chemistry but have tried to explain them in simple terms. I have also used a lot of simple calculations to check whether explanations are plausible.

I have benefitted greatly from the advice of colleagues who read chapters in manuscript: Professor Donald Lee and Drs Jeff Bale, John Grahame, Joe Jennings, Peter Mill, Judith Smith and Stephen Sutton.