does not define mathematical formulations or expressions clearly enough and, biologically, is very patchy in its explanations. For example plasmids are not described at all, whilst the accounts of Mendelian genetics and schistosomiasis are far too simple. There are disappointingly few references, especially to real biological examples, although a series of exercises, with solutions, is included.

The problem with *Wildlife Population*

Ecology is that it is essentially unedited. The usefulness of the collection would have been increased no end if a substantial, critical analysis of the papers had been included; as it is, the editor contributes only two pages of commentary. Also, this book suffers from having no index, an omission for which I see no excuse. □

Michael B. Usher is Senior Lecturer in the Department of Biology, University of York.

A farewell to Chinese metaphysics

J.S. Jones

Population and Evolutionary Genetics: A Primer.

By Francisco J. Ayala.

Benjamin/Cummings: 1982. Pp.263.

\$13.95, £11.90.

Evolutionary Principles.

By Peter Calow.

Blackie/Methuen: 1983. Pp.116.

Hbk £13.95, \$35; pbk £6.95, \$15.95.

EVOLUTIONARY biology ought to be — but too often is not — the child of a marriage between ecology and genetics; a description of genetic changes in populations in terms of the ecological properties of each genotype. Strangely enough, the enormous advances made by its parental sciences have scarcely been reflected in much of the modern theory of evolution. Instead this remains obsessed with its own history, and the controversies which fill evolutionary texts today — random or directed change; gradual or sudden evolution; and the species, the group, the individual or the gene as the unit of selection — are those which occupied Haldane, Fisher and even Darwin himself. There is a synthesis between evolutionary genetics and evolutionary ecology only in the sense that Dickens' encyclopaedist synthesized his article on Chinese metaphysics from those on China and on metaphysics.

Each of these texts gives a very different view of modern evolutionary theory. That of Ayala is not new, as two-thirds of it is taken directly from the very successful *Modern Genetics* by Ayala and Kiger (Benjamin/Cummings, 1980). It gives a clear and straightforward account of quantitative theories of mutation, natural selection, genetic drift, inbreeding and multifactorial inheritance, together with a balanced treatment of modern views of speciation. The book takes most of its examples from work on *Drosophila*, and, as is reasonable in an introductory text, avoids many of the most controversial areas of evolutionary biology. It is more concerned with the genetics than with the ecology of evolutionary change.

Evolutionary Principles has a much less traditional approach. In a rather bewildering

succession Calow discusses the various controversies of evolutionary theory: the adaptationist programme; selfish DNA; the evolution of sex and of life history strategies; group and kin selection; cladistics; punctuated equilibria, and the developmental genetics of zebra stripes. His treatment is outstandingly up to date, as a third of the references cited have been published since 1980. To fit all this into a hundred pages of text leads to a certain

Depth in ichthyology

Alwyne Wheeler

Biology of Fishes.

By Q. Bone and N.B. Marshall.

Blackie/Methuen: 1982. Pp.262.

Hbk \$39.95; pbk £11.95, \$25.

Fishes: An Introduction to Ichthyology.

By Peter B. Moyle and J. J. Cech Jr.

Prentice-Hall: 1982. Pp.580.

\$33.95, £27.15.

FISHES are the most numerous group of vertebrates, outnumbering mammals, birds, reptiles and amphibians by at least two to one. With some 20,000 species the variations in fishes' body form and life style are enormous, and they have succeeded in colonizing virtually all the living space available to them. It is perhaps because of this diversity in form, function and habitat that there have been relatively few authoritative textbooks treating them.

Bone and Marshall have produced just this. Following a brief account of the diversity of fishes, giving details of the features of each major group, they provide analysis of the basic biology of fishes. Chapters dealing with swimming, buoyancy, osmoregulation, gas exchange and circulation, and reproduction, approach each topic from an anatomical stance with broad discussion of the physiological processes involved. The final chapters on sensory systems and the central nervous system contain stimulating discussions on aspects of these systems, making full use of the latest literature while also serving as a vehicle for the authors' own researches.

According to the preface, the book is designed for advanced undergraduates and postgraduates but the authors assume a very considerable foundation in natural

breathlessness and one doubts whether the book is quite as "intelligible to the uninitiated as to the well informed" as is claimed in the preface. However, Calow does succeed in communicating the excitement of a developing field. His book might best be read after working through Ayala's more sedate treatment of the subject.

Although each of these books is in its own way a success, neither is a new approach to the problem of synthesis in evolutionary biology. The recent evolution of textbooks on evolution has been, like evolution itself, a gradual process. Not for many years has there been a macromutation such as those which produced Fisher's *Genetical Theory of Natural Selection*, or Goldschmidt's *Major Features of Evolution*. The world still awaits a convincing synthetic treatment of modern views on the subject. □

J.S. Jones is in the Department of Genetics and Biometry at University College London.

sciences on the reader's part. I would suggest that only exceptional undergraduates would be able to understand it throughout, but many specialists will find it of outstanding value for the summation of the literature and the insights into fish biology provided.

In *Fishes* Moyle and Cech have aimed for a wider readership although primarily addressing students of fish biology. Their treatment of the orders of fishes is extensive and includes discussion of the major families, the reader gaining a wider perspective as a result. The authors also dwell on ecology rather than purely descriptive morphology which has the effect of producing a text about living creatures not specimens. An introductory section on structure and form, which includes accounts of morphology, respiration, feeding, reproduction, sensory perception, and behaviour and communication amongst other topics, provides background information of the classical kind. Later parts of the book on zoogeography and ecology combine to produce a complete account of the natural history of fishes.

Moyle and Cech have produced a refreshingly new, general account of ichthyology. Their book deserves to take its place as a textbook on ichthyology for undergraduate students, and will serve to broaden the horizons of many others whose work or hobby brings them into contact with fishes.

These two books are not competitors but are properly complementary. Moyle and Cech provide a broad background to ichthyology; Bone and Marshall take the subject deep into the fields of anatomy and physiology. Together they mark a great advance in the presentation of our knowledge of fishes. □

Alwyne Wheeler is an ichthyologist at the British Museum (Natural History), London.