Heredity (1977), **39** (3), 421-424

REVIEWS

MICROBIAL AND MOLECULAR GENETICS. J. R. S. Fincham. Hodder and Stoughton, London, Sidney, Auckland, Toronto, 1976 (2nd edition). Pp. 150+viii. Price: £2·25, paper back.

This book provides in 138 pages a well-structured introduction into the biological aspects of molecular genetics. It is written for the " ambitious beginner in biology ". Although molecular biology and molecular genetics can easily be dealt with as an end in itself, the advantage of Fincham's book is that molecular biology is used to explain biological problems. The first introductory chapter gives a brief outline of the basic problems of genetics, and the genetic systems of eukaryotes and prokaryotes are described. DNA is introduced in the second chapter and established as the genetic material. Replication *in vivo* (the Meselson-Stahl experiment, Cairn's autoradiography) and *in vitro* are presented in a clear but condensed form. Mapping the genome deals with *Neurospora crassa* as a eukaryote and with bacterial recombination by conjugation, transduction and transformation. The molecular mechanism of recombination is clear but restricted to one page. Mutation is discussed as an analytical method including the use of conditional mutants for the study of indispensable functions. Induced mutagenesis comprises base analogues, alkylating agents, nitrous acid and UV. The role of cellular repair systems is reported in connection with UV-mutagenesis. The gene concept is elaborated in the chapter on gene action. Not surprisingly, Fincham dedicates a special section to intra-genic complementation. This is an important principle and not sufficiently well understood by many biologists. Transcription and translation precede the section on the deciphering of the genetic code by biochemical and its confirmation by genetic methods. Regulation of gene action is dealt with not only using the lac-operon of *Escherichia coli* but including also the ara-operon and the his-operon of *Salmonella typhimurium*. It is clearly pointed out that there is not only one type of regulation. Again, this is an important message for the general biological audience who most readily thinks of regulation in terms of the lac-operon. It would have been nice to see a little bit more detail on regulatory systems in fungi; there is only a short paragraph. Even though this is a brief account, the inherent problems are clearly pointed out in this chapter. The reader will find the chapter on plasmids very rewarding to read. There, Fincham relates plasmids to " degenerate viruses " and presents a unifying concept for transmissible plasmids, the F-factor and filamentous viruses. In the last chapter on " Physicochemical Mapping and Manipulation of the Genome " the reader is guided through the marvels of modern DNA-mapping, gene isolation and construction of artificial genetic vectors. Finally, the possibilities and limitations of genetic engineering are discussed with the complexity of multicellular organisms in mind. The last two chapters are very clearly written and profitable to read for everybody who does not have the time to follow the original publications in this field.

This book does not give any great detail on the enzymology of DNA-replication or topology of ribosomes or any other topic. Some may consider this as a weak point. However, there is no point in swamping the beginner

biologist with many details. It is much more important to provide a solid frame of concepts, and this has been well done. There are a few selected references for all but the first chapter, although there is only one 1975 reference, a few of 1974 and the rest farther back.

Fincham's extremely disciplined style has allowed him to present on 138 pages a well-balanced documentation of microbial and molecular genetics. The text is very condensed and certainly a challenge for speedy readers. Aside from being a beginner's text it will be extremely useful for the more advanced student to revive previously acquired knowledge and incorporate it into a sound conceptual framework and this in a matter of a few hours' reading.

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ECOLOGICAL GENETICS. E. B. Ford. Chapman and Hall, London (4th edition). Pp. 442+12 text-figures, 18 plate-figures. Price: £11·60.

When a work that has already become a scientific classic is reprinted as a major new edition, it deserves more than a cursory glance. Indeed, it should be carefully scrutinised, and comparisons with earlier editions become legitimate. When it first came out, this book was hailed by some as a triumphant vindication of the author and his colleagues, but others were more sceptical, and criticised its apparent imbalance of content.

As the majority of readers will know, *Ecological Genetics* started essentially as a review of some methods and principles of the subject, backed up by examples taken from studies at Oxford University during the halcyon early days of the 1940's, 1950's and early 1960's. A few chapters were devoted to research by Oxford graduates after their departure, but little else was reported from outside. The fourth edition brings many of these studies up to date and extends the coverage to include some of the recent developments in biochemical genetics. It remains, however, one man's sometimes idiosyncratic view of the successes and failures of the science that he has helped to establish as one of the cornerstones in our understanding of biological evolution.

Despite several years' additional data the phenomena of variation in *Panaxia dominula* and *Maniola jurtina* remain as enigmatic as ever. Ford's annual survey of *Panaxia* at Cothill Fen has been continued up to 1972, and the *medionigra* gene remains at a low level. There can now be little doubt that natural selection is in some way responsible for controlling the gene frequency, but there seems to have been little success in establishing the real nature of any selective forces apart from non-random mating. It is disappointing to learn that there has not been a more recent analysis of the full population data since that of Williamson in 1960, despite the accumulation of another 15 generations of information.

Maniola jurtina presents one of the most curious stiuations in current evolutionary genetics. Patterns of apparently widespread stability contrast with two or three areas where phenotype frequencies fluctuate markedly from site to site, and from year to year. Sometimes the border between areas shows a cline, sometimes a reversed cline, and sometimes a more patchy