Book reviews

Bacterial and Bacteriophage Genetics (4th edn). Edward A. Birge. Springer Verlag, New York. 2000. Pp. 559. Price £44.50, hardback. ISBN 0 387 98730 4.

This is very much a pre-genomic, '*E. coli*-centric' treatise on prokaryotic genetics with a traditional emphasis (one quarter of the book is devoted to it) on describing the biology of lytic and temperate coliphages. It is written as a textbook with the intended (North American) audience being advanced undergraduates and not-so-advanced graduates.

Typically, a course on bacterial genetics is a rite of passage for students going on to specialise in many areas of genetics and molecular biology. Since bacteria are generally considered genetically haploid (see below), have a rapid generation time and can be easily grown to large population densities, traditional genetic analysis is that much more straightforward than for diploid eukaryotes. The limited size of the genome has also meant that recent genomic analysis has tended to advance more quickly with certain 'model' micro-organisms. Many of these same organisms tend to be considerably more tractable in terms of genetic manipulation, and particularly in the case of *E. coli* they are indispensable as surrogate intermediate hosts for cloning eukaryotic genes. Thus, bacterial genetics is a necessary and recommended stepping-stone for the many students who will subsequently turn to look at the intricacies of higher organisms, including the increasingly popular focus on human genetics.

This is the fourth updating of an established format. I would suggest that the revision is simply not radical enough. Moreover, several eccentricities in style and content are noteworthy. Sections on chromosome structure and transcription begin with, respectively, chromatin structure and transcriptosome assembly in eukaryotes. For the latter, at least this does help in the understanding of Archaeal promoter function, but at the risk of introducing unnecessary complication early on. In relation to ploidy, the context is set with a description of haploid and diploid yeast. Bacteria, on the other hand, are haploid. However, the author then suggests this is not the whole story in bacteria as replication produces extra copies of the genome before cell division. This only serves to confuse a genetic term with a physical description and the eager student moving to the questions at the end of Chapter one is then faced with a poser on diploid bacteria.

There are several other oddities. For example, messenger RNA half-life is discussed in a section on protein folding. *E. coli*, we are informed, is 'only one of a few organisms that readily undergoes conjugation', although subsequently we read that 'there are well-documented conjugation systems in many other bacterial genera...their number is such that it is not possible to even list them all.' My last gripe concerns the poor coverage of transposable elements. They are acknowledged as being of major importance in plasmid biology and bacterial

evolution, but just how they move around is left to a small section (entitled 'Single Site-Specific Recombination') describing Tn10 and phage Mu. Where is the Tn3 paradigm, or an account of IS elements and other compound transposons?

In conclusion, although students looking for a comprehensive and contemporary account of coliphage biology will be rewarded here, the key traditional microbial genetic paradigms are presented with greater impact and clarity in several other textbooks, some of which also attempt to cover recent advances in genomics.

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The Applied Genetics of Plants, Animals, Humans and Fungi. B. C. Lamb. Imperial College Press, London. 2000. Pp. 405. Price £35.00, hardback. ISBN 1 86094 179 6.

Dr Lamb has given us a solid, serious book on applied genetics. It includes a lot of the genetics you might need to know if you are thinking of starting work with a new eukaryote and need to appreciate its genetics. It also includes some of the things you may not have realized you would need to know, for example, the average values for sperm per ejaculation from a selection of animals.

The book takes the reader from a useful revision of genetic terminology through the rudiments of population genetics and on to the various approaches available for changing your organism's characteristics — and holding on to them. The book finishes quite properly with an introduction to the hard economics that must be faced by anyone intending to apply their science in the market place.

So are there any minus points? Yes, but in such a wide-reaching tome there are bound to be limitations. For example, the 'new' genetics has generated some new words and it would have been useful to introduce some of these terms, such as 'paralogues' and 'orthologues'. From my own perspective as a yeast geneticist, I am all too aware that the simple rules of *Saccharomyces cerevisiae* genetics do not hold true in the big bad world. Out there, haploids left to their own devices might switch mating type and mate with their daughters to form diploids, rather than persisting in indefinite mitosis. Other cells might either fail to mate or to sporulate because of aberrant ploidy levels. We are not warned of this in the book.

My biggest criticism is really for the publishers. There is a nice selection of colour pictures at the end but they really should have applied a little more imagination to the presentation of the rest of the material which, to be frank, is a little

dull. This is partly due to the lack of colour to break up the tide of black type, and partly an apparent reluctance to use figures rather than text. It is particularly difficult to follow some of the genetic crosses when genotypes wrap around two lines. This not a difficult problem to address and many undergraduate text books do succeed in making genetics come to life with imaginative diagrams.

Notwithstanding these criticisms, I shall keep the book in my office and will no doubt find it missing when I need it,

having forced some hapless undergraduate or research student to face up to their failure to appreciate the scope of genetics.

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Books Received

PCR. M. J. McPherson and S. G. Møller. BIOS Scientific Publishers, Oxford. 2000. Pp. 288. Price £22.95, paperback. ISBN 1 85996 017 0.

The Horizontal Gene Pool — Bacterial Plasmids and Gene Spread. Christopher M. Thomas (ed.). Harwood Academic

Publishers, Amsterdam. 2000. Pp. 419. Price £69.00, hardback. ISBN 90 5702 462 4.

The Century of the Gene. Evelyn Fox Keller. Harvard University Press, Cambridge, MS. 2000. Pp. 186. Price £15.95, hardback. ISBN 0 674 00372 1.