important need: it also makes stimulating reading, and it should be on the library shelves of all genetics and microbiology departments/laboratories. The paperback edition is also cheap enough to find its way into many pockets, haversacks or briefcases.

ERIC REEVE,
Department of Genetics,
University of Edinburgh

A Genetic Switch: Gene Control and Phage. By MARK PTASHNE. Oxford: Blackwell Scientific Publications. 1986. 128 pages. £12.95. ISBN 0 86542 3156.

Phage lambda has been the subject of intense interest since the early 1950's, after its happy discovery as a resident of *E. coli* K 12. A flood of papers followed, culminating in the famous 1971 book *The Bacteriophage Lambda*, which left many of us floundering in the complexities and mysteries of its terminology and dual life-style; until an equally important book, *Lambda II*, appeared in 1983, cleared up most of these mysteries, and added the complete DNA sequence (48,514 b.p.) and much associated information for us to brood upon. Since then, research on lambda has eased off a little, though the phage has meanwhile acquired a vivid new life-style as a cloning vehicle. One may hope that Lambda III will appear in 5–10 years with solutions of all the remaining mysteries; but in the mean time one of the leading contributors to lambda biology, Mark Ptashne, has produced the book under review.

Lambda possesses a complex and subtle switch mechanism to determine its choice of path towards lysis or lysogeny after infection, and the author thinks that an understanding of this biochemical apparatus may be relevant to the problems of cell differentiation in higher organisms, where genetic switch mechanisms must also be operative. His book, then, concentrates on the present view of the lambda switch mechanism, and describes this system in a novel way that makes it comparatively easy to understand for the newcomer to this branch of biology (and for dippers into the area like myself). After introducing some basic facts about genes and how they work, the book's first three chapters describe lambda's development 'from three perspectives: from a distance, showing the overall pattern of events involved in the interaction between virus and host; more closely, describing in coarse molecular terms a key event in the process; and very closely, showing precise molecular interactions'. These chapters give no experimental justification for the processes as described, but chapter 4 explains the principles of some of the key experiments leading to the present view, and gives a number of references to both research articles and reviews. Three appendices then discuss 'Designing an efficient DNA-binding protein', 'Strong and weak interactions', and 'Control of transcription in eukaryotes and prokaryotes – a common mechanism'.

This book is a welcome addition to the lambda literature. It is very lucidly written and extremely well illustrated, so that the essentials of the switch mechanism become very clear; and it is both a pleasure to read and a most helpful introduction to the complexities of the complete lambda biology described and speculated on in *Lambda II* (edited by Hendrix, Roberts, Stahl and Weisberg, Cold Spring Harbor Laboratory, 1983). The Lambda switch mechanism is very complicated, involving not only the DNA-protein interactions of the cI and Cro proteins and the tripartite operator site separating the *cI* and *cro* genes and overlapped by their promoters, but a number of other genes and their products – *N*, *Q*, *cII* and *cIII* – and a confusion of promoters and terminator sites which can be overridden when convenient by the N or Q proteins. The choice of switch setting seems to depend on the concentration of the unstable cII protein and the backup it gets from cIII (if I understand it correctly).

Some of the difficulty in grasping the details of this system come from the terminology, which evolved not with the organism but with its students. This terminology is even more firmly built into the subject than QUERTYUIOP... is built into the English typewriter and computer keyboard. The latter was, I believe, designed to make it impossible for early typists to type fast and so snarl up the crude mechanism, but attempts to replace it by an easier symbol order have never got anywhere. Likewise, we shall just have to get used to lambda terminology, as have those who use it: it is needlessly confusing, but not impenetrable.

In conclusion, I should like to suggest that lambda may not need such a complex system to maintain its place in *E. coli*. So I challenge Mark Ptashne – or others in the field – to design a better/simpler switch mechanism and associated circuitry for lambda, on the assumption that evolution does not always produce the best solution. Addressing this question might help in understanding lambda.

ERIC REEVE,
Department of Genetics,
University of Edinburgh

Molecular Biology and Crop Improvement. A case study of wheat, oilseed rape and faba beans. R. B. AUSTIN, R. B. FLAVELL, I. E. HENSON AND H. J. B. LOWE. Cambridge University Press for the Commission of the European Communities. 1986. 114 pages. £17.50. ISBN 0521 32725 3.

This book deals with the ways in which the techniques of molecular biology could be applied to crop improvement, especially of wheat, oilseed rape and faba beans. It comprises a report to the Commission of the European Communities by the Cambridge Plant Breeding Institute. While the attention to wheat requires no comment, oilseed rape and faba beans are of increasing economic significance as substitutes for imported vegetable oils and meals for animal feed.