

BOOK REVIEWS

Around the Operon

The Lactose Operon. Edited by Jonathan R. Beckwith and David Zipser. Pp. ix+437. (Cold Spring Harbor Laboratory: Cold Spring Harbor, New York, 1970.) \$12.

THE lactose operon is undoubtedly the most productive system in molecular biology, for from its exploitation have developed most of the concepts of how gene action is controlled in bacteria. Understanding how this operon functions is thus essential to anybody interested in nucleic acid and protein synthesis, and the aim of *The Lactose Operon* is to provide such enlightenment. Produced by the Cold Spring Harbor Laboratory, already famous for its renowned annual *Symposia on Quantitative Biology*, this book heralds a new venture in scientific publishing. This volume is the first of a series of Cold Spring Harbor monographs; a future issue about phage lambda is already planned.

The book falls into two sections. The first part is a series of ten reviews which cover all aspects of the research which has been performed on the lactose operon. The second part comprises sixteen articles describing recent research; these derive from papers presented at a meeting held at Cold Spring Harbor in September 1969.

The review part of the book is indeed a success. The tone is set by an introduction in inimitable style by Jacob and Monod, and this is followed by Beckwith's admirably clear account of the genetic analysis of the operon. Even workers who are familiar with this research will find the chapter worth reading. Of course, not all the authors of this volume possess the same facility for writing reviews but, in general, the aim of making information readily available to those not themselves engaged in research on the lactose operon is well fulfilled.

A particular highlight is the discussion of the lactose repressor by Gilbert and Muller-Hill. The chapters on transcription of the operon are also especially useful, not least because they make clear the techniques used to tackle this problem and avoid the pitfall of divorcing the conceptual conclusions from a proper consideration of how the results were arrived at. A topic which might perhaps have been discussed in greater detail is how polarity may be explained at the level of translation.

Because of the burgeoning state of the

scientific literature, many people will be acquainted only with the better popularized aspects of lactose operon function. Nevertheless, topics such as complementation in β -galactosidase doubtless interest many workers who are intimidated by the complexity of the original research papers. The chapters which discuss the enzymes of the operon, including the less well-known β -galactoside permease and transacetylase coded by the second two genes, thus provide much relevant information which is not otherwise readily available.

After reading the reviews, the less specialized reader should presumably feel encouraged to proceed to the research reports and thus get more of the feel, as it were, of the system—reviews inevitably cast a slightly artificial light as they cannot but be written with the advantage of hindsight. Many of the research articles will be interesting in this context, although others do not seem to follow so well from the review section. Ullman and Monod's report of ω complementation, in particular, adds very nicely to the previous reviews, as indeed do the reports of catabolite repression and repressor properties. Whether subunit assembly of β -galactosidase is rate limiting on induction is an interesting question which has not been previously aired, and well illustrates the type of research communication which perusal of the review section should make clear and enjoyable. On the other hand, a new method of isolating the lactose repressor, for example, is not of much conceptual interest except to those working on its structure and function. Nor is it clear what is the *in vivo* significance of the partial loss of activity which β -galactosidase undergoes when subjected to prolonged storage *in vitro*.

On the whole, this is a reasonably priced and well produced book which should be read by everybody interested in the control of gene action. The reviews are in general notable for the sense of perspective which they convey and are united by a coherent theme—something very often lacking in multi-author books. Some of the research articles have a more restricted appeal and will largely interest only those more intimately involved with the lactose operon, but several, at least, will convey the sense of present approaches to the system. The need for explanations of the type which this book provides is very great, and Cold Spring Harbor will perform a considerable service to the scientific community if

the future volumes planned are as well written as this one. BENJAMIN LEWIN

Spindles and Kinetochores

Cellular Mechanisms of Chromosome Distribution. By Peter Luykx. (International Review of Cytology, Supplement 2.) Pp. vii+173. (Academic: New York and London, September 1970.) 112s.

THIS volume is devoted to a consideration of the structure and functions of kinetochores and spindles and the interactions between them which result in the chromosome movements characteristic of cell division. The text is divided into four chapters, the first an introduction to the genetic importance of precise chromosome distribution. The second chapter includes a discussion of the nature and significance of the variability encountered at the polar regions in different cell types, and this is followed, in the third chapter, by a detailed account of the ultrastructure and function of kinetochores, together with the variations in behaviour found at mitosis and during the two meiotic divisions. In the final chapter, entitled "Mechanisms and Models of Chromosome Behaviour", chromosome movement on the spindle is described and the role of spindle microtubules evaluated. A model of chromosome orientation and movement is proposed and contrasted with the scheme proposed by Dietz. The chapter concludes with examples of non-random chromosome segregation which have proved difficult to explain by any hypothesis.

The layout is good and critical appraisal is made simple by the author's clear separation of the facts he describes from his own interpretations. The unavoidable publication delay—the text is now a year or so out of date—means that more could be added to supplement the points discussed by the author, but this is to be expected in any rapidly advancing subject.

A wide range of topics is covered in this book and in less than 150 pages of text a useful compilation of facts, ideas and references is presented. The volume may be compared in its size and range of interest with Schrader's classic monograph *Mitosis*, now rendered out of date by the results of recent advances in cytological techniques. For this reason it clearly fills a gap in the literature of cell biology and therefore merits being read by all those interested in this subject.

S. A. HENDERSON