sions" Gymnocystidea and Ascophora) are in fact so novel in content that they amount to new orders. Some terms introduced in the chapter on stenolaemates—"coelocyst," "eustegal," "colonial epithelium," and others—are set down without a hint that they are altogether new. These sections seem to have been directed more toward the author's colleagues than toward the student and general zoologist, for whom a more conservative approach would have been desirable.

The book comes attractively bound and happily low priced. This situation will no doubt speed its dispersal to its intended audience. I hope so; these interesting and important little animals deserve more attention.

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A Key Biological System

The Lactose Operon. JONATHAN R. BECKWITH and DAVID ZIPSER, Eds. Cold Spring Harbor Laboratory, Cold Spring Harbor, N.Y., 1970. x, 438 pp., illus. $12.

This useful and distinguished volume, organized as 10 review chapters and 16 research articles, resulted from a conference on the *lac* system held at Cold Spring Harbor in September 1969. As the editors point out, the lactose operon of *Escherichia coli* clearly is one of those key biological systems on which much of the development of molecular biology has depended. The publication of the book comes nearly a decade after the announcement of the operon concept by Jacob and Monod (who wrote the introduction) and some 25 years after the pioneer work of Monod on enzymatic adaptation. The book constitutes an eloquent statement of the progress made since those early days.

Genetic aspects of the *lac* system are stressed throughout the book. A general review features diploid analysis, deletion mapping, and uses of transducing phages and fusion strains. A broad spectrum of mutants is described. The enzymes specified by *lac* genes, betagalactosidase and thiogalactoside transacetylase, are characterized in terms of isolation, composition, subunit structure, isoenzymes, complementation, and immunological properties, as well as various features of enzymatic activity. The normal *lac* repressor and several mutant repressors, including superrepressors, are treated. The *lac* permease system is reviewed thoroughly. It is suggested that the name "permease" be reserved for the entire transport system rather than for an individual protein component. Specific messenger RNA and its formation are covered, with emphasis on kinetics, polarity, and transcription starts and stops. Translational punctuation and polarity and the effects of deletion of translational start signals are likewise considered. A DNA-directed cell-free system for betagalactosidase synthesis that has a variety of experimental potentialities is reported. Catabolite repression and effects of cyclic adenosine monophosphate receive their share of thoughtful attention.

Appropriately, this volume by and large is written in the style of the experimentalist, and it goes a long way toward documenting the influential role that the *lac* system has played in the exploration of the cell's informational macromolecules. This system has no doubt contributed much to the *E. coli*'s-eye view that many life scientists have of molecular biology. And *lac* is estimated to represent only 0.15 percent of the *E. coli* chromosome! It is clear that a highly successful extrapolation has occurred. By the same token, there is of course the danger of overgeneralization. Is action at the gene the only mode of regulation of protein synthesis? Is the *E. coli* operon, with its high degree of clustering of functionally related genes, characteristic of the organization of all genetic material?

This note of caution notwithstanding, the stimulating contributions do bear out what is stated in the introduction, namely, that "the *lac* system is as yet far from having lost all its charm and mysteries" and that much "remains to be learned from bacteria." Thus, coupled with a reference to the enthusiasm with which a number of molecular biologists "are abandoning K12 for BALB C or some other mammal, such as a nematode," is the apt reminder that "there is always 'room at the bottom.'"

All in all, this book recommends itself as a very authoritative and readable source of information for anyone interested in macromolecular biosynthesis and its regulation.

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Neurochemistry

Protein Metabolism of the Nervous System. A symposium, New York, April 1968. ABEL LAJTHA, Ed. Plenum, New York, 1970. xxii, 732 pp. illus. $45.

This is an ably organized tome on a process pivotal to cellular existence in general and to neural response in particular. Its 38 chapters (by 67 contributors) are grouped into four sections.

In the section Metabolism Related to Turnover, S. Roberts considers characteristics of cytoplasmic ribosomes derived from neural tissue. The problem of ribosomal research is unbelievably complex, particularly if one is to translate from findings in vitro to actual events in the cell. The salient observations in this chapter relate to the unusual instability of cerebral neuronal polyribosomes at low magnesium concentrations or in the presence of pancreatic ribonuclease. Cerebral ribosomes appear to be unusually responsive to polyuridylic acid in stimulating incorporation of amino acids. M. R. V. Murthy's studies deal with the separation of membrane-bound and "free" ribosomes of rat brains as a function of development. He finds that membrane-attached ribosomes are largely polysomal and more resistant to degrading agents than the "free" polysomes. This may be due to multicomponent association of the membrane, messenger RNA, and the *de novo* polypeptide. Most of the observations in this paper are offered in support of the idea that membrane-bound ribosomes are responsible for secreted protein while "free" ribosomes synthesize proteins for intracellular uses. B. D'Monte, N. Marks, R. K. Datta, and A. Lajtha examine protein turnover in mitochondrial subfractions with respect to proteinase and aminopeptidase content, incorporation of amino acids into membrane proteins, and protein composition of submitochondrial fragments. Study of the outer membranes shows localization of aminopeptidase. The authors justifiably take a cautious approach to interpreting from "marker" enzymes. Their succinct discussion of these enzymes reveals the unsatisfactoriness of findings in this area.

The significance of protein breakdown as a regulatory mechanism is further elaborated by N. Marks and A. Lajtha and by A. V. Palladin and Ya. V. Belik. Work on insoluble proteins of the synaptic plasma membranes (SPM) is described by H. R. Mahler and C.