Genet. Res., Camb. (1983), **42**. 111–114
Printed in Great Britain

Book Reviews

Heat Shock: From Bacteria to Man. Edited by MILTON J. SCHESINGER. Cold Spring Harbor Laboratory, P.O. Box 100, Cold Spring Harbor, N.Y. 11724. (1982). 440 pages, $45.00 ($54.00 outside U.S.). ISBN 0 87969 158 1.

Until about 1978 the heat shock or stress response (the selective increase in synthesis of a few proteins in response to a heat shock or other experimental stress) was of interest mainly to a handful of biologists working with the fruitfly, Drosophila. In the past few years, however, there has been an explosion of interest in the phenomenon, sparked off by the discovery of a strikingly similar stress response in all organisms examined. This led to the first 'Heat Shock' meeting being held at Cold Spring Harbor in May 1982, and this book is a record of that meeting. A glossy, hard-backed and expensive book prepared from the proceedings of a research meeting is likely to suffer from being already out of date by the time it is available. This book is an exception. This is partly because, despite the high quality of the printing and reproduction of photographs it was available seven months or so after the meeting. Only in the section dealing with the dissection of DNA sequences involved in the induction of the Drosophila heat shock genes is the book behind the times. Mainly, though, this is an exceptional book because it is the first collection of data from several different disciplines and many different organisms all bearing upon the same universal biological phenomenon – the stress response.

The book takes the form of about fifty short (about eight pages) research reports describing recent experiments on diverse aspects of the response. The format makes the book extremely lively and readable and is particularly appropriate in a new field like this where, inevitably, more questions are asked than are answered. The most important unanswered question is: what is the function of the response and of the heat shock proteins? Two major types of evidence emerge that bear upon this question. Firstly the extraordinary conservation of the response and of the proteins throughout evolution is emphasized in a number of reports on organisms as diverse as flies, frogs, humans and slime moulds. This point is made most dramatically in the report from E. Craig and her colleagues showing directly that genes in yeast and *E. coli* encode proteins that are about 75% homologous to the major Drosphila heat shock protein (hsp 70). Since in both yeast and Drosophila hsp 70-related genes comprise a gene family, some members of which are expressed in unstressed cells, these highly conserved proteins probably have an important function in normal metabolism and development as well as in the stress response. Secondly evidence is presented from several laboratories indicating that the stress response induces thermotolerance although the direct involvement of the heat shock proteins themselves is not established. Other questions concern the regulation of the heat shock response which in diverse organisms has both transcriptional and translational components. Several reports describe the features of the response in *E. coli* and yeast. The existence of a stress response in these microbes offers the opportunity to use their well developed genetics to study the induction and function of the response. The book describes the starting point for what will be a fascinating series of investigations. The reader is left anticipating further volumes in which the biology of heat shock is unravelled.

PHILIP MASON
Imperial Cancer Research Fund
Mill Hill Laboratories
Burtonhole Lane
London NW7 1AD