

mutagenicity assays as rapid and economical tests for chemical carcinogens.

While the somatic mutation hypothesis is by no means proven and while as Heidelberger has recently pointed out (Cancer (1977) 40, 432), salmonella do not get cancer, certain bacterial mutagenesis tests do hold the greatest promise as rapid tests for the ever growing list of organic chemicals which are putative human carcinogens. A number of tests are described in the greatest detail. Simple tests involve measurement of repair of DNA damaged by chemical mutagens or tests of the ability of chemicals to cause mutations or chromosome abnormalities in yeast, bacterial, mammalian and human cell. At the other end of the scale is a description of the specific locus test first described 25 years ago which uses more than 24 000 mice and takes 18 months to complete.

Many chemicals are only mutagenic after metabolism *in vivo* and each *in vitro* technique has an inbuilt metabolising system usually a mammalian liver supernatant containing microsomes. Alternatively host mediated assays are described where the target cells (yeast or bacteria) are injected into mammals treated with promutagens and isolated at a later time and mutants assayed. Another technique measures mutation in whole animals such as the fruit fly or parasitic wasps since they apparently activate promutagens similarly to mammals. Proce-

dures which assess the effect of chemical mutagens by their ability to cause chromosomal or nuclear damage in peripheral lymphocytes are particularly important since they can be used for continual monitoring of workers exposed to chemical mutagens. Most of the authors are well aware of the problems that may arise in tests when one is measuring the effect of chemicals which may be both activated and deactivated by competing pathways and Green's chapter contains an appendix on:

(i) How to make every experiment a positive and
(ii) How to make every experiment a negative.
Nevertheless since this book may be used primarily by those who wish to set up routine screening tests, a chapter describing in detail the pitfalls likely to be experienced in these tests and the problems of extrapolating to man, would have been invaluable.

There are some particularly important chapters at the end on the safe handling of mutagens, and on the statistical interpretation of mutagenicity tests.

This book is not very good value for money since almost half of the chapters have already been published elsewhere but it is a very useful book. In view of the ever increasing need for safety at work I am sure it will soon appear on the bookshelves of the chemical and pharmaceutical industries.

T. A. Connors

Biochemical Methods in Cell Culture and Virology

by Robert J. Kuchler

Dowden, Hutchinson and Ross; Stroudberg, PA, 1977
ix + 331 pages. £22.50, \$38.00

This book is designed for research workers who wish to learn sufficient cell biology to enable them to use cultured cells in animal virology, or for cell biologists who may wish to examine any endogenous or defective viruses the cells are carrying. The book is divided into three sections.

The first deals with cell culture and three chapters describe the culturing and handling of cells *in vitro*.

the media used for maintenance and growth of animal cells *in vitro*, and some methods for manipulating cell populations *in vitro* (synchronisation, fusion). The methods are competently, although not critically, described and this section is basically a collection of published methods. No mention is made of two important sources of contamination; that due to mycoplasma and that due to cross-contamination

with other tissue culture cells. (A substantial number of heteroploid human cells are now known to be HeLa cells.) Nor is there mention of the different patterns of growth control exhibited by cells in culture, and the ways in which they can be studied; 3T3 cells are, for example, not discussed.

The second part of the book deals with virology, and describes in two chapters, methods used for the isolation and identification of human viruses, and virus growth and purification. These chapters provide a useful summary of methods, some of which are hard to find elsewhere. The book describes, for example, the complement fixation procedure in detail. There is a very brief, and again uncritical, account of radioimmune assay. In the next chapter, a brief survey of the major virus groups is followed by a useful collection of virus purification methods.

The third section deals with methods for analysis of DNA, RNA and proteins. The section describes for the radioactive labelling, fractionation and characterisation of these macromolecules. All the methods described have been widely used; nearly all

of them are now seriously dated. The oligonucleotide mapping technique described in the book is no longer used, and cylindrical polyacrylamide gels have been completely superseded by slab gels. Part of the problem is the rapid advances that have been made in these techniques, but even so, surely a brief mention could have been made, and it is sad to find a book already fairly seriously out of date.

In summary therefore, the book provides an introduction to the techniques of cell culture and biochemical virology. It is useful to have them collected together, though each section, in itself, is no improvement on the currently available books. The book suffers from two disadvantages. First it is too uncritical of the methods it describes; this is inevitable with a single author manual that describes so many different techniques, and a multiauthor book would have been better. A description of what goes wrong with each technique and how to deal with this would have been invaluable. Second the book has dated; there are few references later than 1972.

D. C. Burke

Myocardial Failure

Edited by G. Riecker, A. Weber and J. Goodwin
Springer; Berlin, Heidelberg, New York, 1977
xiv + 374 pages. DM 48, \$21.20

Symposia are valuable to the participants who benefit from the two-way exchange of ideas. It is much less clear that their subsequent publication in minimally edited form helps anyone — except perhaps publishers. So often talks which in the flesh were good, even catalytic, tend in print to become yet another version of that well worn story so familiar to other workers in the field. The undisputed value of bringing together workers from different backgrounds to mull over a particular topic is rarely captured in the published version and all the reader has is a mixed bag of rather brief papers all relevant to the topic but often giving a fragmentary and incomplete picture. Published in this form, the proceedings of a symposium neither have the detailed exposition of methods required in a primary publication nor the rounded perspective of a

review. They are, therefore, ephemera that must come low on the shopping list of libraries.

All these remarks apply to 'Myocardial Failure'. As a symposium it brought together clinicians and basic scientists; but as a published volume it is very patchy containing some good papers but also a great many poor ones. There is little or no attempt at synthesis and the reader is frustrated from doing this himself by the glaring gaps — for instance on the basic electrical properties of the myocardium. Despite these criticisms most people who read 'Myocardial Failure' should find something new and if the book serves to direct them in their reading of the primary literature, it could be claimed to have served a useful purpose.

P. F. Baker

Biochemical Methods. Biotechnology Methods. Environmental Science & Engineering. It is necessary that cell culture medium is produced so that it mimics the physiological conditions within tissues. In vitro growth of cell lines requires a sterile environment in which all the nutrients for cellular metabolism can be provided in a readily accessible form at the optimal pH and temperature for growth. L-Glutamine is more labile in cell culture solution than any other amino acid and the rate of degradation is dependent on storage temperatures, age of product, and pH. It is usually added in excess to culture medium, as it can be a limiting factor during cell growth. However, the degradation of L-glutamine causes a buildup of ammonia, which can have a detrimental effect on some culture suspensions. Biochemical pathways underlying various mechanisms of cell death differed for different viruses. Materials and methods. Cells. Human lung adenocarcinoma Calu-3 cell line was obtained from the cell culture collection of the Institute of Virology (Marburg, Germany) and was grown in a mixture of equal parts of minimal Dulbecco's Modified Eagle Medium (DMEM) and DMEM-F12 supplemented with 10% fetal calf serum (Gibco BRL, USA) and antibiotics gentamycin (25 µg/ml), penicillin (50 U/ml). The journal's title Analytical Biochemistry: Methods in the Biological Sciences declares its broad scope: methods for the basic biological sciences that include biochemistry, molecular genetics, cell biology, proteomics, immunology, bioinformatics and wherever the frontiers of research take the field. The emphasis is on methods from the strictly analytical to the more preparative that would include novel approaches to protein purification as well as improvements in cell and organ culture. The actual techniques are equally inclusive ranging from aptamers to zymology.