of fungi and application in practice, Local and systemic antymycotics, mycotoxins and mycozoonoses. There is a very brief two-page subject index to the 388 pages of text.

The contributions of some of the invited speakers have a very familiar ring and space does not permit separate comments on each. However, amongst those that I found noteworthy and that I think might interest some medical microbiologists are "Host parasite interactions in fungal diseases" by J. B. M. Smith, "Aflatoxin in relation to the epidemiology of human liver cancer" by F. G. Peers, "Variation of the antigenic structure of Candida albicans blastospores cell wall, practical repercussions" by D. Poulain, A. Vernes and J. Biguet, "Serodiagnostic value of extracellular antigens from proteolysing Candida albicans cultures" by S. Staib, S. K. Mishra, T. H. Abel and M. Focking, "Antigenic properties of Aspergillus and practical consequences" by A. Vernes and J. Biguet, "Emmonsia crescens—the causative agent of nephritis epidemica Scandinavica?" by K. Holmberg and C. O. Kindmark, and "Causal associations of mycotoxic nephropathy" by P. Krogh.

At a cost of about £42 this is not a book I can recommend for purchase by medical microbiologists; it is to be hoped it will be available for consultation in some of the specialist libraries.

R. R. Davies

**The beta-lactam antibiotics: penicillins and cephalosporins in perspective**


The 50th anniversary of Fleming's discovery of penicillin has just been celebrated in countries throughout the world, and we have had the antibiotic available for therapy since 1942. At various times this group of antibiotics has seemed in danger of passing under a cloud. First, there was the worry of sensitisation and, latterly, there have certainly been severe problems with the emergence of resistance. But new derivatives have always appeared, and there is little doubt that the \( \beta \)-lactams will be with us well into the 21st century.

The commercial success of this group of antibiotics has made them the subject of intense research by scientists in the pharmaceutical industry and of huge pressure from their colleagues in the marketing departments. Indeed, so many are the derivatives now available, and so fine the distinctions between them, that there is a grave danger of the whole subject becoming simply too complicated and voluminous for the mere mortal. Everywhere one hears the question: "How do I chose between them?". Against this background, then, any book that can clarify, explain and guide would be of the greatest advantage.

This book seems to me to be aimed exactly at the required target. Moreover, it is cheap by modern standards and, if suitable, could become the vade-mecum of all, both clinical and technical, who deal with \( \beta \)-lactams. In practice, the book ranges between the excellent and the awful. In the areas where I am able to judge—basically the underlying science and the "para-clinical" aspects of the subject—the most factual sections are by far the best. There is much information easily accessible here that is hard to find elsewhere. For example, which \( \beta \)-lactams are available where and in what formulations. There are also excellent sections on what one might call the technology of \( \beta \)-lactams: MIC determinations, \( \beta \)-lactamase identification, and that sort of thing.

It is where the book moves on to the more discursive aspects of the matter that I am less impressed; and in certain areas it is hard to credit some of the massive errors and misconceptions. So much so that one must say that this text—particularly the sections on the role of \( \beta \)-lactamases in resistance and on the ecology of resistance—can be likened to a death trap for students.

Let us take one or two examples. In chapter 5, the author talks of the periplasmic space of gram-positive bacteria, and in fig. 1 (p. 177) gives us a diagram that would be hilarious were it not so dangerous for the student intent on learning. One simply has to be able to distinguish the "double-layered" nature of biological membranes from the "double-membrane" system found in gram-negatives, but no—I repeat not—in gram-positives, if one is going to write on this topic. This misunderstanding on the author's part is particularly unfortunate, because a
knowledge of these structural matters is essential in understanding current work on how β-lactamases do actually protect bacteria. Certainly, we still do not understand everything in this area; but the account in this book simply ought not to have been written.

The chapter on evolution of resistance—also apparently by the same author—manages to advertise most of the traps available in the field by falling into them. There seems to me to be a total failure to distinguish the emergence of resistance characters from the emergence of resistant populations—a distinction that must be at the heart of evolutionary studies. In general, the account given here presses for the demotion of mutation as a source of resistance and argues for transfer as the springboard for evolution. But if mutation is not involved, why are all the β-lactamases of gram-negative species not identical? And why do sequence studies show major primary sequence similarities but not identity? And why do the β-lactamases show some sequence similarities with some of the enzymes of cell-wall biosynthesis? No—mutation plays a central and vital role in the evolution of resistance, and no one can doubt it now. Indeed, it is impossible that it should not.

And as far as the evolution of resistant populations is concerned, one cannot realistically say (see p. 229) that “there is no substantial information on how R factors originated”. This might have been a fair statement 5 years ago, but the discovery of insertion sequence and the inverted repeat sequences of transposons has changed all that. Indeed, how one could attempt to write a chapter on the evolution of resistance without mentioning these elements is beyond me. This chapter is simply severely out of date, and would have been so 2 or 3 years ago. The reader should be reassured; things are much more exciting and satisfying than implied here. For a lead into the field he (or she) could do worse than consult the Royal Society Symposium, “Fifty years after Fleming”.

These serious imperfections are particularly unhappy because so much in this book seems to me to be so excellent. In particular, the opening contribution on the history of β-lactams makes one realise how well Professor Selwyn can write. For his next edition he should take his courage in both hands and also do the chapters on the role of β-lactamases and on evolution himself. I guess he would make a first-class job of them.

M. H. RICHMOND

**Bacterial adherence**


Over the past decade the importance of microbial adherence to host surfaces in determining colonisation and infection has been repeatedly demonstrated in medical, dental and veterinary bacteriology—the 14 reviews in this book cover all these aspects of bacterial adherence and in addition deal with marine bacteria and eukaryotic cells.

In the first chapter Drs Ofek and Beachey give a useful introduction to the subject, covering the concept of surface hydrophobicity and charge and the nature of the interactions between ligands and cell receptors. They stress the importance of phenotypic and genotypic variations in determining bacterial adhesion and consider the different types of cell to which bacteria adhere, finishing with a discussion of adherence and infectivity. The next chapter concentrates on the normal flora rather than on pathogens, dealing with mechanisms of adhesion and methods for studying the phenomenon.

The next eight chapters deal in the main with the mechanisms of adherence of a variety of human pathogens and potential pathogens. Some deal with specific organisms (Streptococcus mutans, Mycoplasma pneumoniae, vibrios and neisseriae), while others concentrate on the structures responsible for adherence (fimbriae, lipoteichoic acid). This mixed approach is, I think, successful because one of the notable features of the book is the way in which it blends very detailed biochemical and indeed biophysical analysis with descriptive work at the cellular and whole-animal level.

It is very easy for microbiologists working with animals and man to forget that they are dealing with only a small proportion of the micro-organisms present in the environment. The chapters on marine organisms and microbial adherence in plants are timely reminders of this.