show that, in contrast to trypanosomes of the *T. brucei* subgroup, there is an apparent lack of correlation between morphology and biochemistry of the organisms in the mammalian host and the arthropod vector. They suggest that the parasite adapts to its different environments by having available at all times the metabolic machinery it needs.

The remaining reviews deal with other Kinetoplastida, and with more general aspects. F. G. Wallace (Minneapolis) summarises the biology of the kinetoplastida of arthropods, and J. Lom (Prague), the trypanosomes and trypanoplasts of fish, which are transmitted by leeches. W. E. Ormerod (London) explores some of the less fashionable hypotheses and unsolved problems that concern the development of *T. brucei* in its mammalian host—pleomorphism, sexuality, "aberrant" forms, "latent bodies", tissue forms and stages—in the light of recent findings. He is confident that the existence of a tissue phase will eventually be proved. G. A. T. Targett and P. Viens (London) review the problems of immunity to trypanosomes of the subgenus *Herpetosoma* in rodents, and W. J. Herbert and D. Parratt (Glasgow) provide two chapters, one on the characteristics of the parasite and vertebrate host that determine virulence, and another on heterophile antibodies. S. H. Hutner and his colleagues give a characteristically racy and thought-provoking account of the nutrition of the kinetoplastida, and the volume ends with a report by W. H. R. Lumsden and D. S. Ketteridge of the recommendations made by an international meeting on characterisation, nomenclature and maintenance of salivarian trypanosomes, held in London in 1976. This article should help to standardise terminology and practice, and to dispel some of the confusion that exists.

This is a valuable book, written by experienced field and laboratory workers who know their subjects and provide useful, detailed bibliographies. It seems ungenerous to carp, but, as with volume 1, the delay in publication has driven several contributors to write addenda to bring their reviews up to date. Volume 2 is the same size as volume 1 but has more pages of a thinner, heavier paper that would be expected to support the printing of excellent photomicrographs. Alas, in the review copy the blocks have been swamped with a superfluity of ink, turning the backgrounds dark grey and obliterating much fine detail in general subfusc. Some photographs, such as those in Lainson and Shaw's article, are of an almost uniform black. In fig. 3, which purports to show a sloth (arrowed) in its natural habitat, there is no sign of either sloth or arrow. But the text, expensive though it is, is marvellous.

**L. G. GOODWIN**

**Bacterial infection and immunity in domestic animals**


This book was conceived as a result of suggestions by a group of the author's former students in the Veterinary Faculty at the University of Melbourne. It is an unusual and stimulating book, and the enthusiasm of a dedicated teacher is apparent throughout.

Quoting from Montaigne, the author writes in his introduction "I have gathered a bouquet of flowers from other men's gardens: nought but the string that binds them is my own." The "flowers" and "flower arrangements" represent a personal choice—an offering to senior veterinary students, graduate students, and others. The book is concerned with the properties of micro-organisms that influence pathogenicity, and with the resistance of the host. Thus, it is truly a book about infectious disease.

The wide range of topics includes many in which rapid progress has been made in recent years. There are chapters on cell walls and capsules, toxins, tissue and host specificity, microbial interactions, normal microbial flora, attachment, penetration, immune mechanisms in various parts of the body, and other topics. Dr Woolcock culs information from the veterinary and medical fields. His style of writing is robust and effective, occasionally a little rough and ready. He deals with complex matters in a businesslike fashion and is rarely short of a suggested explanation where knowledge is lacking. Occasionally a misleading statement has found its way into the text. For example, under the heading *Host specificity* it is stated that loping ill affects only ovine nervous tissue. There are some useful illustrations; magnifications are not given.
Inevitably in a book of this kind the reader will sometimes feel frustration at unattributed statements, but a reading list is given at the end of each chapter.

The book, although expensive, is enjoyable and useful. Young research workers in particular should find it helpful as a source of information and ideas, and as a means of sharpening their teeth. Their own efforts at the bench should ensure that their feet remain on the ground.

G. R. SMITH

The bacteria


The publication of the first volume of the treatise The bacteria, edited by Gunsalus and Stanier, in 1960 was timely because it approximately coincided with the evolution of microbiology as a separate discipline in science faculties in Britain. Previously the centres of the field had been in medical faculties. Although microbiology in the USA was similarly tied to the medical faculties, scientists there had shown a more catholic approach than the universities in Western Europe and the treatise The bacteria was one of the fruits of the American experience. The original treatise provided an authoritative approach to the procaryotic microbes although the procaryote-eucaryotic division has emerged since.

One impression of this volume 7 of the treatise is of the immense amount of knowledge that has been accumulated since 1960. Of the nine chapters, seven have analogous counterparts in volume 1 of the series. These chapters cover spores, cell surfaces, cell appendages, cell walls and bacterial viruses. Only two new topics, nitrogen fixation and chemotaxis, are added in the latest volume. This approach is disappointingly static. The new volume is subtitled Mechanisms of adaptation whereas the first volume was entitled Structure. The change in the title is misleading.

Some of the articles are massive. Those on the structure and biosynthesis of cell walls and the outer membranes of gram-negative bacteria by Tipper and Wright cover nearly 200 pages and clearly constitute a monograph on their own. There are other extensive articles on spores by Dworkin, chemotaxis by Koshland, permeation of cell surfaces by Saier, cell appendages by Sokatch. Other subjects are given light treatment. The excitement of developments in chemotaxis are conveyed although there was a tendency for the excitement to give way to euphoria. The account of the control of cell division by Helmstetter, Pierucci, Weinberger, Holmes and Tang is timely. It gave the impression that studies in this field have reached an impasse. Could this be because the division event essentially is only one, possibly minor, of the many that make up the cell cycle? If so, the impasse may be generated by attempting to regard cell division in isolation.

This volume is a valuable work of reference for the general microbiologist and definitively treats the present position of most of the subject matter. The diligent creative research of the many bacteriologists whose work is cited calls for our admiration. The retirement of Stanier from the team of editors is a matter for regret. No doubt he will remain a source of inspiration to the new editors.

S. J. PIRT

Adhesion of microorganisms to surfaces


In reviews of microbial pathogenicity an analogy is sometimes made to life in a flowing stream. The pathogens that involve mucosal surfaces will be swept away unless they become attached to the host's cells. Most of the contributors to this symposium apparently share the belief that concepts introduced by physical chemists will explain the way in which bacteria adhere to surfaces. Biologists have profited before from the ideas of physical chemists though