

of view would have been most useful: for example, the relationship of scrapie to system diseases; the persistence of the term "neuromyopathic" (Parry, page 99) when the claim that scrapie is essentially a muscle disease has long been dismissed; and the contributions to the discussion of pathology of multiple sclerosis and scrapie by specialists in other disciplines (page 186). The most controversial part of this symposium is, not unexpectedly, that dealing with slow virus infections where the nature of the scrapie agent has attracted so much speculation (see leading articles, *Nature*, 214, 755; 1967; and *Lancet*, ii, 705; 1967).

A lucid introduction to the problem of virus infection of the nervous system is provided by Dr Tyrrell ("Virus Behaviour and the Cell") and usefully elaborated in the discussion. A well placed question by a neurologist (Dr Spillane) enables Tyrrell to offer a concise and lucid interpretation of the chickenpox—zoster relationship, though important clinical questions (for example, that by Dr Pallis, page 73, on the significance to be attached to a four-fold increase in titre in herpes infections) are left unanswered.

A feature of the general discussion with which the symposium closes is the contribution made by molecular biologists. I endorse Spillane's remark that "one would have to be harbouring a very powerful antibody to imagination if one was not to profit from this meeting". One is reminded of Claude Bernard's aphorism: "Put off your imagination, as you put off your overcoat, when you enter the laboratory. But put it on again, as you put on your overcoat, when you leave". This volume, however, is on the whole singularly free from that perplexing entanglement of observation, interpretation and hypothesis which sometimes makes it so difficult to get at "hard" facts. As such, it is to be recommended to all who wish to learn the direction of modern virological thinking with regard to the nervous system, and who are interested in the problem of latency of viral "infection".

E. J. FIELD

## AGAINST FUNGI

### Fungicides

An Advanced Treatise. Vol. 2: Chemistry and Physiology. Edited by D. C. Torgeson. Pp. xiii + 742. (Academic Press: New York and London, April 1969.) 327s.

THIS is the companion to volume one, which dealt with agricultural and industrial applications and with environmental interactions of fungicides.

Most of chapter one of the second volume describes in detail the evidence which shows that many fungicides pass freely into fungal conidia and act internally and not on the surface as was assumed too often in the past.

The second chapter complements the first by giving a general account, largely in physical-chemical terms, of the ways in which fungicides can or may react with the various components of cells that they affect.

There follow twelve chapters by different authors on fungicides grouped for the most part on their main chemical properties, otherwise on their origin in micro-organisms or in higher plants. Inevitably and rightly, therefore, the chapters differ widely in length and approach. Thus the one on "Inorganics", excluding sulphur compounds which are dealt with separately, is very brief, occupying only 17 pages, whereas the account of organic sulphur compounds occupies 155 pages and deals in great detail with the reactions and fungitoxicity of the hundreds of compounds that have now been studied.

In contrast, and as could be expected, oils are treated quite differently. Here the emphasis is on their use and how they may function in disease control.

Elemental sulphur, organic mercuries, other organo-metallic compounds, heterocyclic substances, quinones,

aromatic compounds and a miscellaneous group of non-aromatic organic substances not covered elsewhere are treated in a somewhat similar, though by no means uniform, manner, but again with emphasis on the biochemistry of their activity against fungi.

The chapter on antibiotics is a concise and very readable account of the structure, biochemistry and use of the various types that have found or may find a place in disease control.

The last chapter brings together the now substantial body of data on the miscellaneous fungitoxic compounds that occur in healthy plants or that accumulate in plants as one of the results of infection or other forms of damage and which may play a part in disease resistance.

There are a number of relatively minor criticisms that one might make of this as of any other book that aims to do so much; in particular, the somewhat excessive detail and tabulation detract from the value of some chapters. But the scope of the treatise, the standing of the authors and the depth and quality of their contributions make it a standard work of reference that will retain its value for many years to come.

Most plant pathologists and others who work in crop protection would want to own this book. Inevitably, one has to point out that the price means that almost all will have to rely on borrowed copies.

R. K. S. WOOD

## AFRICAN GEOGRAPHY

### Environment and Land Use in Africa

By M. F. Thomas and G. W. Whittington. Pp. x + 554. (Methuen: London, 1969.) 90s.

THIS collection of essays is in three parts: studies of the natural environment, studies of the social environment, and case studies of various parts of tropical Africa. Most of the authors are British geographers who have taught in African universities and now have posts in this country. Their contributions, coloured by their own research experiences, provide up to date assessments of topics and problems which usually receive only superficial treatment in more comprehensive textbooks on the geography of the continent.

J. T. Coppock, best known for his work on agricultural geography of Britain, points to some of the opportunities for work in this field in tropical Africa. J. A. Davies and P. J. Robinson, discussing the assessment of evapotranspiration losses, show that precipitation exceeds potential water losses over only 10 per cent of the continent, an area outlined by the boundary between forest and savanna. They make a comparison between water balance maps obtained from simplified theories of energy balance and vapour transport. S. Gregory emphasizes the need for more studies of rainfall reliability but underlines the dangers of misapplying results: "... a deficiency of rainfall occurring with a 10 per cent probability should not be expected to occur 10 times in a century, and even less likely is it that it will occur once in a decade". He might well have set the question of variability against what is known of longer term fluctuations in climate. Interesting facts that emerge are that the rule of increasing variability with decreasing mean annual rainfall applies only very approximately, that the variability of annual rainfall in west Africa is not very different from that in Britain, and that in the downstream portions of the larger rivers of west Africa over half the flow occurs in the dry season. M. F. Thomas considers the applicability to land classification of the sequence of deep weathering and stripping, which he has shown to explain many features of the landscape in south-west Nigeria, and concludes that it may well be useful in areas of moderately low relief bordering interior basins of sedimentation. R. A. Pullan, on the other hand, discussing West African soils, parti-