

use this information has been put in *Soviet Progress in Forest Fire Control*.

The last report is an analysis of the calorific value of moss, fern, grass, conifer needles, branchlets and resin.

This publication is somewhat disappointing; this may be due in part to the expectation gained from the title that the reader is going to learn a lot about forest fire control. He does not, which is a pity.

C. J. TAYLOR

THE WORLD OF PLANTS

The Life of Plants

By E. J. H. Corner. (The Weidenfeld and Nicolson Natural History.) Pp. xii+315+41 plates. (London: Weidenfeld and Nicolson, 1964.) 55s. net.

BOTANISTS often wonder why their subject, critically concerned as it is with the food and therefore the primary welfare of the whole human race, has remained so long the Cinderella of the biological sciences. A cynic might suggest that the neglect springs from a deep-seated disinclination in the human mind to grapple with essentials, but there is another and simpler reason. When botany and zoology emerged from their purely descriptive phases the latter was able to advance rapidly because zoologists, being themselves examples of their own subjects, could interpret a good deal about them in terms of personal experience—an advantage that was denied to the botanists. For this reason there has always been a certain difficulty in coming to grips with the study of plants, which has in consequence tended to become either chemistry or physics or, alternatively, taxonomy. Only in recent years has an awareness begun to grow that an enquiry into the principles on which the life of plants is ordered may reveal truths quite as important as those derived from the study of animals. *The Life of Plants* is a valuable amplification of this still small voice and deserves a warm welcome.

The author has a mind of considerable originality and powers of penetration, and he has made good use of both to write an introduction to the world of plants which is novel without being eccentric. Furthermore, the book is very well produced, and notable because nearly all the many illustrations are either new, in the sense that they have not appeared in a book of this kind before, or have been drawn or re-drawn with skill and care, though it must be said, more in sorrow than in anger, that Fig. 96, with its Mercator's projection, is the exception which proves the rule.

The book has fifteen chapters of which the first six provide a remarkable study of the algae, mainly from the point of view of their significance as the modern representatives of the aquatic forerunners of the present sub-aerial land-flora, and it is pleasant to notice here a long-overdue tribute to the neglected writings of A. H. Church. The next six chapters are, in effect, almost entirely concerned with seed-plants, though many others are included, and these amount to what has been sadly lacking in the past, namely a broad general exposition of the flowering plants by one with a really wide interest in, and experience of, tropical vegetation, and this part of the book is certainly likely to draw most attention and applause. Mr. Corner would have been more than human had he refrained from riding one or two hobby-horses, but even these exercises are spirited, and excellent for the sluggish botanical liver. The last three chapters deal with Mr. Corner's second (or is it first?) love, the fungi, and they are as interesting as the rest.

To do full justice to this unusual book is a hard task and perhaps the most sober verdict that can be brought in with regard to it is that no one can possibly read it without being a better botanist and without knowing

more about plants afterwards than he was or did before. To advanced students, and especially to the best of them, it will be a delight, and something to be savoured when all else begins to pall.

Apart from its factual content the book does, however, raise two issues of considerable interest and wider context. The first, and lesser, is how far it is possible to breathe new life into familiar and perhaps dry facts by clothing them in new words. Mr. Corner's expressive style of writing is one of the pleasures of his books, but at times it seems to take him dangerously near incoherence and there is a risk here and there that the less-sophisticated reader may fail to understand, or may even misunderstand, his meaning. The book is unlikely to prove easy reading to anyone without a sound grounding in botany.

The second point is more serious. The central theme of the book is, as it must be in all biological writings which are neither formal nor systematic, that of organic evolution. A writer dealing with this subject can easily slip into a "slough of despond" from which escape is difficult, and it is a tribute to Mr. Corner that he avoids this peril. Nevertheless one must feel some regret that so acute a thinker has not, apparently, been able to free himself more completely from the indoctrination of an outworn Darwinism, or to take more account of the change in attitude towards this in recent years. R. GOOD

A NEW AGRICULTURAL ATLAS

An Agricultural Atlas of England and Wales

By Dr. J. T. Coppock. Pp. 255 (205 maps). (London: Faber and Faber, 1964.) 63s. net.

THIS new *Agricultural Atlas of England and Wales* contains, in addition to a large number of maps, a substantial text providing historical and explanatory comment. The author is to be congratulated on its comprehensive nature, because only by reference to such a detailed study can the considerable diversity of agricultural activity in these areas be appreciated.

After a brief statement of the aims of the *Atlas* and a description of the methods used in its preparation, the first chapter presents an interesting discussion of the factors, other than the more obvious physical and economic ones, which can affect enterprise choice and combination in farming. The second and third chapters provide a well-illustrated physical and economic background for the distribution of crops and livestock. There are then three chapters dealing in some detail with the distribution of tillage crops, grassland and horticulture, and a chapter covering the distribution of the various classes of farm livestock. In these four chapters, which comprise the major portion of the *Atlas*, the problems of describing crop and livestock distribution graphically have been given full consideration. By using more than one map for the individual tillage crops and types of grassland, the author has attempted to illustrate not only their distribution as a proportional area but also their relative importance. In order to map the regional importance of different classes of livestock, a weighting system based on relative feed requirements has been used. This converts the various classes of livestock into a common unit, the "livestock unit". The resulting difficulties of map interpretation can, however, be overcome by reference to the accompanying text. The distribution of separate classes of livestock is shown both in relation to the distribution of other livestock and in relation to land use. An interesting feature of the chapters on tillage crops and livestock is the inclusion of maps indicating the most common associations of crops and of livestock, and how these associations are distributed.

The remainder of the book is devoted to a chapter dealing with combinations of enterprises in farming, and

a chapter discussing the future possibilities for mapping more fully the agricultural information which has been, and is, accumulating in such quantity throughout England and Wales.

There are three appendixes and a select bibliography. The first appendix provides additional information about sources and the construction of individual maps. The second, contributed by A. Sentance, of Birkbeck College, London, is a technical description of the processing of data for the *Atlas* by computer. The third contains details of the various crop, livestock and enterprise combinations, and some selected statistics. The bibliography is restricted to publications of direct relevance to the contents of the *Atlas*, and is helpfully classified by reference to the various chapters.

J. L. BEVERIDGE

MILESTONES IN VIROLOGY

Selected Papers on Virology

Edited by Nicholas Hahon. Pp. xv + 363. (Englewood Cliffs, New Jersey, and London: Prentice-Hall, Inc., 1964.) 60s.

AN alternative title to this book might be "The Birth of a Science"; virology, that ugly word of doubtful parentage, is now a dynamic biological discipline.

For his compilation, Dr. Hahon has selected forty papers, spanning nearly two centuries, beginning with the paper by Edward Jenner on cowpox in 1789, and ending with the recent work of Trentin, Yabe and Taylor on the quest for human cancer viruses published in 1962.

It is difficult to make a representative selection of only forty papers out of such an immense field; but the author has carried out his invidious task with care and perspicacity. Whatever his choice, it is inevitable that some criticism of it would be made. One feels that Iwanowski deserves more than casual mention, for it was he who first proved the existence of the 'ultramicroscopic filterable viruses', to use a phrase now long obsolete, by showing that the agent causing tobacco mosaic was still infectious after passage of a Pasteur-Chamberland filter candle. F. C. Bawden and N. W. Pirie also deserve a niche in this hall of fame, since it was they who showed that the virus of tobacco mosaic, isolated by Stanley in 1935, was a nucleo-protein.

The time has long gone by when it could be stated that "plant viruses are of an entirely different nature from that of the animal viruses". We should recognize now that there are not four different kinds of infectious agents, each in its watertight compartments of bacterial, plant, insect and animal hosts. The science of virology comprises the study of viruses, no matter from what type of host they are derived. Once freed from the host cell, the similarity between some viruses of completely different origin is remarkable, and who would be bold enough to say at a glance whether a small near-spherical virus, when viewed in the electron microscope, was that of poliomyelitis or turnip yellow mosaic?

The boundaries which separated these four types of viruses are indeed becoming indistinct and doubtful, and the versatility of viruses and their ability to adapt to different hosts are increasingly alarming. Certain plant viruses can multiply in their insect vectors; the virus of swine influenza, which is thought to be a relic of the great influenza pandemic of 1918-19, can multiply in a parasitic lung worm as well as in the pig, and a plant virus causing 'wound tumours' in legumes is thought to have a serological relationship with one of the reoviruses pathogenic to man.

The final paper in this book deals with an absorbing aspect of virology, the viral causation of tumours and the possible relationship of viruses with human cancer. It shows that a virus from man, one of the adenoviruses,

has oncogenic properties and produces tumours when injected into new-born hamsters. Again, who would have predicted that the Rous sarcoma virus, originally only transmissible between certain strains of chickens, is now apparently capable of producing tumours in Primates?

By compiling this book, Dr. Hahon has rendered a great service to virology. He has brought within easy reach many early papers, often difficult to obtain, and, in the increasing *tempo* of virus research, has emphasized the discoveries of major importance.

K. M. SMITH

DRUGS AGAINST VIRUSES

The Background to Chemotherapy of Virus Diseases

By Prof. C. H. Stuart-Harris and Dr. Lois Dickinson. (A Monograph in the Bannerstone Division of American Lectures in Living Chemistry.) Pp. xi + 175. (Springfield, Ill.: Charles C. Thomas, 1964.) 10.50 dollars.

THERE is a feeling in the air that after many years of frustrated hopes we may be about to get somewhere in the field of chemotherapy for viruses. We have learnt so much more recently about the chemistry of viruses and how they multiply that it is now possible to approach the subject in a logical way: no need any more to take bottles off the shelf in alphabetical order and test them in a hit-or-miss manner.

This little book is by the professor of medicine in the University of Sheffield and a senior worker at the Research Department of Boots Pure Drug Co., Ltd., in Nottingham. Between the two, they well know the difficulties of the subject both from the clinical and laboratory angles. The background of the subject is presented in the first three chapters on the chemical composition and multiplication of viruses, their pathology and on the phenomena of virus interference and interferon. The matter is briefly presented in an interesting and up-to-date manner, but does not contain anything much that is not covered in similar accounts in recent text-books and reviews. Chapter 4 gets down to the subject proper, describing recent experimental work in the field, with results obtained in tissue culture, in infected eggs and in laboratory animals. Formulae of the more important groups of compounds are given and the rationale of their use is discussed. Chapter 5 contains a particularly useful account of the criteria necessary to establish that a drug is of value in a human infection. I myself feel that rather more prominence might have been given to the very encouraging results of using a thiosemicarbazone compound for prophylaxis of variola in Madras. In Chapter 6 the authors deal with the rickettsiae and the psittacosis-lymphogranuloma-trachoma (P-L-T) group. They write that "the taxonomic position of the rickettsiae and, to an even greater extent, of the P-L-T group of organisms is still controversial". This is scarcely true any longer: it is almost universally agreed that these are bacteria rather than viruses. The authors contrast them with "the true viruses", but occasionally talk of them as if they really were viruses. Their inclusion in this book is understandable, since it is only against them that chemotherapy has proved its worth: knowledge about this may prove of value in describing a 'background'; it at least shows that we need not despair of tackling an obligate intracellular parasite. A final chapter deals with antibacterial chemotherapy, the action of steroids, and the use of serum as additional aids in the fight against viruses.

Despite our hopes for the future, present achievements in the field of virus chemotherapy are admittedly very meagre. This book simply tells of present difficulties and will serve, one hopes, to consolidate a jumping-off ground for future advance. But for less than 120 pages of straight text, a price of 10.50 dollars is indeed fierce.

C. H. ANDREWES