

REVIEWS

Club Root Disease of Crucifers caused by Plasmodiophora brassicae Woron. *A Monograph*. By JOHN COLHOUN. (Phytopathological Paper No. 3. Kew: Commonwealth Mycological Institute, 1958.) Pp. vi + 108, 4 plates. Price: 20s.

Dr Colhoun is to be congratulated on this detailed and accurate review of the literature, which covers all aspects of clubroot disease and its control, except the cytology of the pathogen, *Plasmodiophora brassicae*. Probably only those familiar with the literature of this disease will realize the appalling nature of this undertaking. It is hoped that many will appreciate the merits of the result.

There have been two previous monographs on clubroot, by Honig (1931: *Gartenbauwiss.* 5, 116) and by Karling (1942: *The Plasmodiophorales*). Honig's review was combined with his own researches on clubroot, has an exhaustive bibliography but is now out of date. Karling monographed the whole group of organisms classified as Plasmodiophorales, giving an extensive treatment of their obscure cytology and detailed accounts of the two economically important diseases they cause, powdery scab of potatoes and clubroot of crucifers. The total volume of research on clubroot, in the last 16 years, is, however, scarcely great enough to require urgent summary. Hence, although the new review was evidently contemplated independently, it might be thought that the existence of Karling's monograph would have made it superfluous. That this is not so is due largely to the editorial blemishes of Karling's book. Mis-statements of fact, wrong references, and references omitted were faults that unfortunately marred an otherwise valuable work. This new review is carefully edited and thorough, besides being more complete in some respects, e.g. data on varietal reaction. A large number of quite useless references has been omitted from the bibliography. It is frustrating to find that a paper in some obscure journal, obtained with great difficulty, contains only the information that the cabbage crop in some remote province of Ruritania was devastated by clubroot in such and such a year. Yet the literature of clubroot includes many papers which tell little more. Dr Colhoun told me that the 400 references in his book were sifted from a list of 1500, a selection which is, in itself, a most useful contribution to the subject.

The main subject-matter is excellently arranged under the following headings: symptoms; life history; environmental factors in relation to infection; reaction of the host to infection; spore survival and dissemination; host range; varietal reaction of cultivated hosts to infection; physiologic specialization of the parasite; the nature of host resistance; control of the disease and methods for the evaluation of soil treatments. Each individual subject is usually dealt with historically or from field to laboratory. The list of headings and subheadings at the beginning of the book greatly facilitates reference. In particular, the organization of the section on control of the disease deserves special praise. There is, generally, a considerable amount of repetition, probably inevitable in a work of this kind, and one feels that the book could be shorter although this is perhaps less a question of literary conciseness than of approach. The author's intention has clearly been to summarize what research workers have stated rather than to assess its significance.

Very few omissions have been noticed. It is surprising, however, to find no reference to Kole's (1955: *Tijdschrift. PlZiekt.* 61, 159) observations on fusion of zoospores from zoosporangia, which are important for the problem of the incompletely known life-cycle of *P. brassicae* and which could hardly be excluded as cytology any more than, say, descriptions of the flagellated stages. Again, although the early descriptions of infected buds are included, Walker's (1942: *Phytopathology*, 32, 18) brief report of apical infection is not. This is unfortunate, because the migration of the parasite up the cambium from root gall to stem apex, recorded by Walker, is an excellent example of the ability of *P. brassicae* to move from cell to cell in the host plant, an ability which was disputed for

many years. There are also instances of papers which are quoted but not all of the information in them is used, even when particularly relevant. A great deal of care has been expended on the compilation of the host range. Presumptive identification with authenticated generic and specific names is made of all names in the literature given without authorities. This is undoubtedly wise, and one might also wonder how carefully a plant pathologist who names a host plant with the authority for the name has really checked its taxonomy.

The style is clear and flows easily. There are some old-fashioned words such as 'malady' which seem out of place and the occasional expression such as 'an unnatural mode of entry for the parasite' (p. 14) which seems both quaint and paradoxical. There may soon be considerable excuse for the error of 'flagellae' (p. 13) for it is said and written so often that even those who started by knowing better may find it difficult to resist the pressure of common usage (Buchanan, 1958: *Bact. Rev.* **22**, 204). The plates are rather disappointing. Roots, in general, are difficult to photograph but I suspect that much of the quality of these pictures has been lost in reproduction.

These are minor criticisms and this book will be of great use to those already familiar with the organism and the disease. To those new to the subject or wishing to refer to it only occasionally the new monograph will be invaluable.

I. MACFARLANE

General Microbiology. By R. Y. STANIER, M. DOUDOROFF and E. A. ADELBERG. (London: Macmillan and Co., 1958.) Pp. xxii + 682, 227 text-figures. Price: 50s.

To do full justice to the merits of this book in a review would require a writer of Caesar's economy, but one can begin by saying that the book, like Caesar's *Gaul*, is divided into three parts. Part I, entitled 'The Properties of Micro-organisms', is concerned with the various taxonomic groups—algae, protozoa, fungi, blue-green algae, bacteria and viruses—and with the autecology of bacteria, in the sense of physiology and genetics. Part I opens with three introductory chapters on microscopy and the discovery of micro-organisms, on the development of microbiological methods and on the role of micro-organisms in the living world. A treatment of the anatomy of the bacterial cell in ch. 7 prefaces chapters on all aspects of microbial physiology as exemplified by bacteria as the most intensively and extensively studied group of micro-organisms. The microbiologists' microcosm includes photosynthetic activity (ch. 11), to the understanding of which a notable contribution has recently been made by Prof. Stanier and his research associates. Part I concludes with two brilliantly written chapters on the genetics, selection, adaptation and evolution of bacteria; the authors' remarks on the evolution and classification of bacteria on pp. 412–414 are worthy of careful consideration by all microbiologists. These two chapters, in which autecology merges into synecology, form a natural bridge with Part II of this book, entitled 'The Ecology of Micro-organisms', which is concerned both with microbial synecology and with the host-parasite relationship in its perfect and imperfect forms. The illustrations are chosen from amongst bacterial relationships, but this part of the book covers an extremely wide field of general interest to biologists. Part of ch. 21 is taken up by a fascinating account of the ruminant symbiosis; ch. 25 on acquired immunity in animals is a model of condensation for the general biologist. Ch. 26 on chemotherapy contains, *inter alia*, a notable illustration of the fact that the rational or scientific approach to a problem may not, in the short run, outyield the empirical approach. Ch. 27 on dynamics of disease in populations provides a useful definition for epidemiologists in need of a short answer (p. 526): 'Any sudden increase in the prevalence of a disease within a population constitutes an *epidemic*. There are epidemics of endemic diseases just as of nonendemic ones.'

The authors declare in their preface that 'This book is an attempt to present a modern synthesis of microbiological knowledge in a form intelligible to the beginner.' At least one middle-aged microbiologist has learnt so much from this book that he can acclaim the 'modern synthesis' as a remarkable feat of integration for the benefit of those with more than a beginner's background of microbiology. The 'beginner' will profit by first reading Part III, entitled 'The Biological Background', but time as well as effort is required to attain perspective, and most beginners will not quickly outgrow what they can learn from these pages.