

unexpected confusion runs right through the book in the misnaming (p. 436) of the polarizability effect which arises from the reagent-stimulated delocalization of  $\pi$ -electron pairs, as the 'inductomeric' instead of the 'electromeric' effect. Moreover, this nomenclature is erroneously ascribed to Ingold, who, in the reference quoted, clearly assigns the term 'inductomeric effect' to the polarizability effect which corresponds to the *electrostatic* polarization known as the inductive effect. The same erroneous terminology is ascribed (p. 71) to Baker and Nathan's concept of the delocalization of the C—H bond electron-pairs of the methyl group in toluene (now known as hyperconjugation), although these authors, again, recognized its true character and designated it by the same nomenclature—namely, mesomeric and electromeric effects.

In spite of such defects and of a number of misprints, which although not numerous are sometimes rather confusing, the book is a valuable account of the physical background and development of modern electronic theories of organic chemistry and will doubtless be welcomed by all interested in this field.

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## PLANT PATHOLOGY

### Plant Pathology

By Prof. John Charles Walker. (McGraw-Hill Publications in the Agricultural Sciences.) Pp. x+699. (London: McGraw-Hill Publishing Co., Ltd., 1950.) 64s.

ALL students of plant pathology will welcome this work by Prof. J. C. Walker, the distinguished plant pathologist in the University of Wisconsin. It is an introduction to the scientific foundations of the subject, and forms a comprehensive treatment of the better-known plant diseases which may serve as a guide to the general principles of plant pathology.

It is, of course, a matter of personal opinion whether the arrangement of the matter in the book is actually the right one to adopt in such an introductory treatise—whether the sequence should be from the 'particular' to the 'general', or vice versa—but there are obvious drawbacks to the former method, which is the one chosen in this work. Following an introductory chapter on the definition of disease and disease terms and on the classification and economic significance of plant diseases, the reader is taken in the second chapter to a discourse on the history of plant pathology. One doubts, however, whether a student new to the subject can appreciate this information, excellent though it be, at this early stage; and it would perhaps have been more profitable to have extended the number of specific diseases described, especially those of trees, with a few others attributed to the Ascomycetes, which are relatively meagrely treated. At the outset, the young plant pathologist is often far more interested in handling the elements of the subject, the different kinds of fructifications and spores, of sclerotia and rhizomorphs, of morbid anatomy and culture work, than in a contemplation of the historical aspects of the subject. Such a dissertation would perhaps be better reserved for a riper stage of experience.

As a study of this subject must obviously go hand in hand with practical work in the field, greenhouse and laboratory, it is very doubtful whether a start

on specific types of disease should have been made with non-parasitic diseases. The multiple symptoms usually presented by these maladies are often very difficult to assign to specific causes, and this section would have been better left until the student had gathered as much information as possible about diseases ascribed to specific organisms capable of being isolated in culture or examined in the plant tissue.

Succeeding chapters are devoted to diseases incited by bacteria (eleven types, with a useful key to the main genera); by Plasmodiophorales (two types); by Phycomycetes (fourteen types, preceded by definitions, but no illustrations, of the diverse kinds of spores and organs in this group); by Fungi Imperfecti (twelve types, prefaced by a scheme of classification in which are included several 'imperfect' forms belonging to the Ascomycetes); by Ascomycetes (thirteen types, with a classificatory outline); and by Basidiomycetes (thirteen types, embracing a number of the smuts, bunts, rusts, *Rhizoctonia*-diseases, and only two diseases of trees). Chapters 10 and 11 deal briefly with phanerogamic parasites (mistletoe and dodder) and nematodes, respectively. These are followed by a comprehensive and excellent account of virus diseases. Other chapters are devoted to the relation of environment to disease development, and host-parasite interactions (this might well have appeared much earlier in the book). Disease control is admirably treated at length in the concluding three chapters under the respective titles, exclusion and eradication, protection, and host resistance.

All the sections and individual types are supplemented by full bibliographies of titles and references. The entire work is beautifully executed (a few typographical errors occur) with 194 figures in line and half-tone, and forms a valuable contribution to the modern aspects of plant pathology.

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## UNCONVENTIONAL HYDRODYNAMICS

### Hydrodynamics

A Study in Logic, Fact and Similitude. By Garrett Birkhoff. Pp. xiii+186+3 plates. (Princeton, N.J.: Princeton University Press; London: Oxford University Press, 1950.) 22s. 6d. net.

THIS is a book of a very unusual kind, quite unlike any of the standard treatises on hydrodynamics. The author himself says that the material treated "involves a heterogeneous combination of destructive logical criticism, detailed experimental fact, and occasional mathematical sophistication, which may at first seem unpalatable to many readers". The first chapter, entitled "Hydrodynamical Paradoxes", gives many examples of plausible arguments which lead to conclusions opposed to observed facts. It is generally supposed that all these discrepancies between theory and observation are due to a single unjustifiable approximation, namely, the assumption of zero viscosity, but Prof. G. Birkhoff claims that there are others. One of the most disturbing is the possibility that very small causes may sometimes produce large effects. This calls urgently for an investigation into the nature of the corresponding partial differential