of their methodology has been catered for, even if indirectly (for example, the commonly used method for quantitative assay of immunoglobulin concentrations by radial diffusion against monospecific antisera is mentioned only in the barest outline). A future edition, however, might benefit by consideration of chromium-51 labelling of red cells and leucocytes; mixed cell agglutination and mixed antiglobulin tests; radio-immuno assay of pharmacologically active peptides; cytophilic antibodies other than reagins; methods involving inhibition on stimulation of cell migration, and perhaps by an extension of the chapter on methods for isolation of specific antibodies. It would certainly benefit by a better index, for a good index enables the reader, who is unlikely to read from cover to cover, to make the fullest use of the wealth of information incorporated in the handbook. Furthermore, quite a brief use of the index revealed to me an uncomfortably large number of errors. These are minor criticisms. The book fulfils a real need and will not disappoint the expectations of the many who have awaited its publication. At 160s, its price is very reasonable. J. H. HUMPHREY

PLANT PATHOLOGY

Physiological Plant Pathology

(Botanical Monographs, Vol. 6.) By R. K. S. Wood. Pp. xi+570. (Oxford and Edinburgh: Blackwell Scientific Publications, 1967.) 63s. net.

UNLIKE animals, plants have few specialized organs and, with this generalized organization, the symptoms of plant disease are less specific and informative than the symptoms of animal disease. Symptoms only provide the most general expression of the relation between the host and the parasite. A deeper understanding of this relationship must be built up by integrating into a coherent whole the results of a variety of observations and experiments, which are usually open to various interpretations which can be highly subjective. Professor Wood tries to give an unbiased picture by presenting as complete an account as he can of the available evidence with suitable comment and leaving the reader to make his own judgments. The result is about 500 pages of comment supported by a bibliography of about 1,300 references ranging in time from 1866 to 1965. This approach leads to some curious anomalies in treatment since well founded and generally accepted concepts tend to generate less literature than those that are more controversial. For example, the role of gibberellins in the development of bakanae disease of rice or the relationship between protocatechuic acid and resistance to onion smudge are dismissed in four and one pages respectively, while the very doubtful part played by fusaric acid and lycopersin in fusarium wilt of tomatoes, which is far from accepted, is discussed for sixteen pages. The current state of knowledge and opinion relating to the effect of toxins in tomato wilt is admirably summarized in the first two paragraphs of the tenth chapter: this would have sufficed for the casual reader while the addition of a short introduction to the bibliography would have introduced readers, more deeply concerned, to the full controversy. If this approach had been applied to other sections of the book the reader would have a clearer picture of the development of the subject and the benefit of Professor Wood's long experience in the field in assessing the present position.

The book is of unquestionable value to specialists, and students wishing to find their way into almost any branch of the subject will find appropriate references and comments to launch them, whether for teaching or research. However, a shorter and more critical text introducing the references would have filled this need equally well and would also have provided the student with a better balanced and more readable account of the subject: one which, by thinning the trees, could reveal more of the

wood. However, it is fair to say that except in the case of balance, which is, after all, a matter of personal opinion, the book fulfils the aim of the series to produce a "carefully balanced account which will inform the advanced student, assist the lecturer and be a point of departure for the specialist".

There are a few typographical errors, but only two were noted which were likely to cause confusion: in Figs. 9.3 and 9.4 the "N" of pyridine is shown as if substituted on a benzene ring. It is also a pity that the plates come adrift so easily when the book is used. All in all, *Physiological Plant Pathology* is a very useful book and at present day prices represents a good money's worth.

S. H. CROWDY

WHAT GOES ON IN CELLS

Progress in Nucleic Acid Research and Molecular Biology Vol. 7. Edited by J. N. Davidson and Waldo E. Cohn. Pp. xv+467. (New York: Academic Press, Inc. (London), Ltd., 1967.) 140s.

MUCH progress in molecular biology has been achieved by putting a searchlight on a few types of micro-organisms. Although the concepts that have been developed in this way are of inestimable value for the study of higher organisms, we still understand very little about the structure and replication of the cytologist's chromosomes, the regulation of chromosomal activity, the stability of messenger RNA, or the precise form in which it passes to the sites of protein synthesis.

Five of the nine essays in this welcome volume are concerned with crucial problems of molecular-cell biology in higher organisms. Gavosto gives a clear and concise account of autoradiographic studies of DNA replication in human chromosomes. He describes how various chromosomes differ both temporally and spatially in their patterns of DNA replication and discusses the interesting differences that have been found between the replication patterns of chromosomes from normal and leukaemic cells. Hnilica's essay on the nuclear proteins is a comprehensive review which will prove to be valuable both for the specialist and for advanced students. Chantrenne and his colleagues, Burny and Marbaix, have written a clear and critical account of the search for the messenger RNA (mRNA) of haemoglobin. Although the concept of mRNA is now firmly held, many important questions about its nature and stability have not been satisfactorily answered even in bacterial systems. Reticulocytes ought to be an ideal source of a specific mRNA from higher organisms, for these cells make only one protein. Unfortunately, despite almost ten years of intensive effort in several laboratories, a clear demonstration of the haemoglobin messenger has not been achieved. In the next article, Hadjiolov presents a wider discussion of the nature of mRNA in animal cells and the theme is extended further by Nemer in the next article—an excellent and readable survey of information transfer by RNA during embryogenesis. Will embryos provide the principal experimental system to unlock the secrets of mRNA in animal cells?

Among the other articles in the book, there is a long and thoughtful review of the genetic code by Woese, who includes the mechanism of its operation and its possible origin and evolution. Larsson and Reichard give a first class account of the enzyme reduction of ribonucleotides to deoxyribonucleotides. This key process is controlled by various ribo and deoxyribonucleotides in a complex manner for which Larsson and Reichard have been able to suggest an elegant model. Phillips and Brown survey the mechanism of action of hydroxylamine—one of the most specific chemical mutagens known and the only one to have been used confidently in codon assignment. Nevertheless, it is still difficult to decide which particular chemical reactions cause the mutations.