

and Greenmanuring" is another chapter which has been redrafted and much additional or recent information provided. Among shade trees several species of *Albizia* and *Erythrina* are discussed.

In the chapter on insect and other pests there are some alterations, notably in regard to mites. With tea the behaviour of mites is variable and a species economically important in one country or district is unimportant in another. Mite damage to tea is often seasonal and the usual sulphur sprays cannot be used because of taint to the tea, a non-tainting acaricide being necessary. The section on nematodes as pests of tea has also been rewritten, where experimental work with soil fumigants and the recent use of marigolds (*Tagetes*) for control is referred to.

Where tea is cultivated, in the wet tropics, the problem of weeds and weeding is usually especially severe. Weeding ranks second in labour costs on the average tea estate. The section on chemical weedkillers has been rewritten, which is not surprising having regard to the advances in this field in the past few years. Some of the modern herbicides that have shown promise in controlling weeds in tea plantations are referred to. Present indications are that weedkillers will secure adequate control but not eradication.

Another part of the book that has been altered or brought up to date is the final chapter ("Statistical Review") where acreage, production, consumption and distribution are dealt with. As the author points out, in a book of this kind great detail is neither possible nor desirable, and it must suffice to present the main data and point out the trends that seem significant, remembering that statistics can become out of date in a remarkably short time.

F. N. HOWES

avoiding the pitfalls of early taxonomic literature. Nutritional requirements of the pathogen are dealt with, including the relationship of nitrogenous metabolites to the production of toxins and hence, probably, to greater plant susceptibility. Nutritional and cytological factors are further analysed in investigations of the physiology of the fungus and its variability in artificial culture.

Field studies have not been neglected and there are good accounts of the effects of environment and cultivar on disease incidence and the methods adopted for estimating crop losses and for forecasting disease outbreaks.

The problems of physiological races, the nature of genetics of resistance, the selection of test differentials, in fact, breeding for resistance at large, have a familiar ring, and it is admitted that information on these subjects is as yet meagre. There is need for a good deal more co-operation on an international basis in this sphere with the aim of much stricter standardization of techniques and materials, particularly genetically pure seed supplies.

Concluding papers on disease control recount the successful adoption on a field scale of phenylmercuric fungicides both in seed-beds and the field, and also the promising use of antibiotics. No mention, however, is made of mammalian toxicity of these fungicides except for a casual reference to eye injury by 'Blasticidin-S'.

It is a pity that such a report is marred by indifferent illustrations. It is not clear what useful purpose is served by many of the black-and-white text figures, and the coloured plates of leaf lesions are disappointing.

J. C. F. HOPKINS

BLAST DISEASE OF RICE

The Rice Blast Disease

(Proceedings of a Symposium at the International Rice Research Institute, July, 1963.) Pp. x+507. (Baltimore: Md.: The Johns Hopkins Press; London: Oxford University Press, 1965. Published for the International Rice Research Institute.) 15 dollars; 120s. net.

THE ideals behind the cliché that the object of agricultural research is to make two blades of grass grow where one grew before lose their force if those extra blades are diseased. Despite a good deal of research during the past thirty years the basic food of half the world, that is, rice, has been seriously curtailed by blast disease, which continues to spread geographically.

In 1949, the Food and Agriculture Organization set up a commission to place rice research on an international basis and a working party made steady progress towards this end, but it was not until July 1963 that an international symposium on blast disease was organized by the International Rice Research Institute (established in 1962) in the Philippines.

The Rice Blast Disease, which is the report of this symposium, is comprised of twenty-eight invitational papers contributed by participants from Asia and the United States, with proposals for intensifying international co-operation by the use of uniform blast nurseries, uniform procedures for resistance testing, and a joint study for differentiating races of the fungal pathogen. There is also an excellent bibliography of nearly nine hundred titles.

The range of research is comprehensive, covering the causal fungus, *Pyricularia oryzae*, the disease and its development, physiological races, the mechanism and genetics of resistance, breeding for resistance, and other methods of control. The morphology, taxonomy, host range, and life-cycle of *P. oryzae* are described, the author

DEVELOPMENT OF PLANTATIONS

Plantation Agriculture

By Dr. P. P. Courtenay. (Bell's Economic Geographies.) Pp. viii+208. (London: G. Bell and Sons, Ltd., 1965.) 25s. net.

THERE is a need for a general text-book on plantation agriculture, setting out the subject for the specialists in the natural and social sciences. Dr. Courtenay is a geographer. His background knowledge is therefore appropriate to the authorship of a book of this type; the stated aim is "to establish and analyse the distribution of this (plantation) distinctive type of crop production". His facts which, from the definition of the subject, are drawn from a wide variety of disciplines are accurate and well chosen; he emphasizes the important point, which has been obscured by political controversy, that many of the less-developed tropical countries owe much of their development to plantation enterprise.

However, as with many geographically biased books, the objective tends to be lost in the attempt to create a narrative. The treatment of the first part of *Plantation Agriculture*, concerned with the establishment and history of such agriculture, is better than the analytical treatment of the second part. Further, there tends to be a repetition of statements; this criticism applies particularly to the third section, in which Dr. Courtenay discusses in detail as case-studies the two plantation crops, rubber and tea. A more satisfactory arrangement would have been to conclude on discussion of the theme "the future of plantation agriculture", a subject of intense interest to students of tropical development.

A weakness is his approach to the crop environment, particularly rainfall variability in the so-called 'tropical regular-rainfall regions', to which the technologists, who are advancing plantation agriculture, are now paying much attention. For example, he states "the shoots of the tea plant grow with a distinct rhythm, unconnected with climate or other environmental conditions, which produces recognised flushing and dormant periods". Yet