

and filariasis, and of the means of guarding against them. The authors recognise in Mauritius only the types of fever quartan, tertian and æstivo-autumnal, and have proved *Anopheles costalis* to be the definitive host of their parasites in that island. Three species of *Culex*—*C. anxifer*, *C. albopictus*, *C. taeniatas*—were shown to be incapable of infection by parasites of human malarial fever. *Anopheles mauritianus* also appears to have no relation to human malaria. The chapters on classification, morphology, anatomy and biology add but little to the literature of these subjects. In the present state of our knowledge of the ætiology of malaria and filariasis a more careful description of the minute anatomy of the organs of the adult insect would have been extremely useful; probably difficulties in the preparation of complete and perfect sections have prevented the authors giving minute histological details. Descriptions of such important structures as the membranous portion of the pharynx, of the salivary receptacle, and of the muscles attached to them, and, in view of the importance of the recent discoveries of the presence of filarial larvae in the labium of the proboscis, the relations and histology of this organ especially, should have claimed the attention of these naturalists. The spermatheca of the female insect is not referred to.

The authors are evidently not acquainted with the structure of the parts of the proboscis. The salivary duct is described as uniting the pharynx to the œsophagus. Careful histological preparations show that this is far from correct; the salivary duct traverses the neck and head below the œsophagus and pharynx, and, in the region of the common origin of the mouth-parts from the head, the duct opens into the salivary receptacle—a chitinous trumpet-shaped organ with a wide membranous proximal end into the middle of which the salivary duct opens itself; while the narrow distal end is applied to the upper end of a groove—the salivary canal—which runs along the whole length of the hypopharynx.

The cells of the epithelium of the stomach are described as:—(1) Large spherical cells, with protoplasm not stained by carbol-thionin, while the nuclei stain pale rose-colour and the nucleoli violet. These are said to be of lymphocytic nature. (2) Small spherical cells, with a deep violet-staining nucleus, and protoplasm which centrally stains with difficulty while the periphery is deeply stained. These the authors consider to be digestive in their functions.

The epigastric glands of the larval stage, eight in number, surrounding the anterior part of the stomach, and the dialysing tube or membrane in the stomach wall, are considered as playing an important part in the digestive functions of the carnivorous larva.

With regard to filariasis, the authors apparently found only *F. nocturna* in the blood of the people of Mauritius where elephantiasis also occurs, and they have been able to trace the complete life-history of the larval stage of this nematode in the thoracic muscles of *Culex anxifer*.

The authors do not appear to have recognised the presence of malarial parasites in the blood of native children, and hence do not refer to segregation of Europeans as a preventive measure. "Eviter les Anopheles" is their advice, and they uphold the opinions of Ross and others that, although, perhaps, absolute ex-

termination of the insects will prove impossible, even in small areas, yet their numbers may, by the application of inexpensive and practicable means, be easily reduced to an almost harmless minimum. They rely chiefly on the use of culicicides, particularly of petroleum, and of culicifuges, such as terebinthene and naphthalene.

H. E. A.

#### OUR BOOK SHELF.

*Disease in Plants.* By H. Marshall Ward, Sc.D., F.R.S., Professor of Botany in the University of Cambridge. Pp. xiv + 309. (London: Macmillan and Co., Ltd., 1901.) Price 7s. 6d.

THIS is a very suggestive work, and the clearness with which Prof. Ward has treated a difficult and complex subject will ensure for his book a welcome on the part of the specialist, not less than that of the wider public to whom the volume is more immediately addressed.

Most treatises on plant pathology deal with the more extrinsic aspects of the matter, such as the host and the parasite, and some of them give accounts of the evil results of an unfavourable environment. But in the book before us the questions raised are discussed from a more philosophical standpoint. The effort is made to discern wherein disease itself really consists, and to ascertain the actual relations and changes involved in the transition from the healthy or normal to the abnormal and pathological condition. "Disease (not diseases) in Plants" is the title of the book, and it fully indicates the general purport of the contents.

In order to place the reader in a position to appreciate the nature of the connection between a healthy and a diseased state, the opening chapters are devoted to a consideration of the normal physiology of the plant-organs and their relations with their surroundings. Then the various disturbing influences which make for, or actually induce, disease are passed under review, and their operations as far as possible explained. The imperceptible gradations by which an organism passes from the healthy to an unhealthy condition are pointed out, and the oftentimes indirect operation of an unfavourable influence is insisted on. One is brought into closer quarters with the heart of the matter on recognising that the most injurious factors are those which operate through the metabolic processes of the plant; just as, it may be remarked, is malnutrition in the widest sense at the bottom of so many of the ills which the animal flesh assumes itself to have inherited. The interference may come through unfavourable conditions of life, or it may be more immediately traced to influences exerted by other organisms such as parasites and the like. And these considerations open the way for discussing the question of "predisposition" and examining the various avenues in this direction leading to possible remedial measures.

Of course in a work of this kind there are some views put forward which may not command universal acceptance, but they are chiefly those concerned with side-issues, and can hardly be profitably discussed within the limits of a brief notice. Enough, it is hoped, has been said to emphasise the fact that the book forms a valuable contribution to a subject of vast importance. For on the right understanding of the nature and causes of disease in plants hang many great commercial and even national interests. The annual loss incurred through the agency of disease is enormous, but the results of current work clearly demonstrate that much of this loss can be curtailed or prevented when its causes are understood and empirical remedies have given place to intelligent counteraction.

J. B. F.