with the text. Aside from these marring features the book constitutes a real contribution to the popularization of modern physics.

LEONARD B. LOEB

PHYTOPATHOGENIC VIRUSES

Handbook of Phytopathogenic Viruses. By FRANCIS O. HOLMES. vii + 221 pp. Minneapolis: Burgess Publishing Company. 1939. $2.00.

THE virous nature of certain diseases of plants has been known since 1892, when Iwanowski described the filterable nature of tobacco mosaic which Beijerinck confirmed in 1898 and interpreted as being a "contagium virum fluidum." Since then many virous diseases of plants have been described, and numerous attempts have been made to roughly classify them.

The present effort of Dr. Holmes to bring out an orderly presentation of these diseases carries far beyond any previous attempt at nomenclatorial classification. He has adopted the Linnean system in common use for the higher biologic forms, applying Latin binomials for virous names. He has also applied common names in accordance and has included the recognized vulgar synonyms.

The author has included as separate entities in this work 129 viruses of seed plants which he considers to be sufficiently distinctive to deserve specific binomial or trinomial designation. In addition he has described under Latin binomials those bacteriophages which can be recognized as distinctive.

Specifically this work treats only those virous entities known to attack plants, including bacteria, under the division Phytophagi. This division is separated into two classes, Schizophytophagi and Spermatophytophagi. The former embraces one family, Phagaceae, in which 40 bacteriophagic species and two varieties are recognized under one genus *Phagus,* of which the type is *P. minimus* (Bacteriophage S13 of the colon and dysentery bacteria).

The Spermatophytophagi contains ten families based largely on symptoms produced on typical host plants.

Family 1. Chlorogenaceae, which is typified by *Chlorogenus callistephi,* the aster yellow virus. The author recognizes nine species and five varieties in this genus.

Family 2. Marmoraceae likewise contains one genus *Marmor* with 53 species and 26 varieties, of which *M. tabaci,* the tobacco mosaic virus, is the type. This largest family contains the more commonly recognized virous diseases which produce mottling or mosaic symptoms.

The remaining eight families are small but distinctive. The Annulaceae embraces four species and three varieties characterized as the ringspot family, of which *Annulus tabaci* causing tobacco ringspot is the type. The Gallaceae or Fiji-disease group with four species is characterized by vascular proliferations of which *Galla Fijiensis* causing Fiji disease of sugar-cane is the type. The Acrogenaceae (spindle-tuber group); Rugaceae (leaf-curl group); Coriaceae (leaf-roll group); Nanaceae (dwarf-disease group) complete the families of the Spermatophytophagi. Each species is treated in a systematic manner under synonyms, suscepts, immunes, geographical distribution, induced disease, transmission, serology, immunology, thermal inactivation, filterability, other properties such as crystallization, sedimentation, molecular weights, etc., control and literature.

The two supplements contain respectively a list of susceptible and insusceptible plants and a list of viruses not treated in the book and about which too little is known for classification. The work is concluded with an adequate index.

The author has stepped out and given his colleagues in the virous field a conception of these entities which must be taken seriously. Whatever is the final decision regarding the nature of viruses, his method of classification is certainly scientific and will appeal to those of us who can not remember whether aucuba-mosaic virus is the same as tobacco virus 6 and nicotiana virus 10. Furthermore, Dr. Holmes has brought together in a convenient form the most accurate information extant on these most interesting and important entities and thus has performed a real service to phytopathology.

As a novelty the book is lithoprinted and loose-leaved and has a spiral metal binding which opens flat, with cardboard covers.

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PLANT MICROTECHNIQUE

Plant Microtechnique. By DONALD A. JOHANSEN. xi + 523 pp. New York: McGraw-Hill Book Company. 1940. $4.50.

THIS is the most extensive review of microtechnical methods as applied to botanical materials that has yet appeared, at least in English. In addition to the space devoted to the more familiar problems of fixation, dehydration, imbedding, sectioning, staining and the preparation of whole mounts, one chapter discusses with satisfying fullness the recently developed smear methods, and another outlines some of the most useful microchemical manipulations. More than 200 pages are devoted to a systematic discussion of special details of culture, preservation for morphological purposes and the cytological treatment of members of all the plant groups from Schizophyta to Anthophyta.

The book, as the preface points out, does not attempt the impossible task of being encyclopedic. In the course of the necessary selection, the author has chosen