

ciples of virology to enable the student to understand the current and rapid advances in the field. However, professional virologists may object to the lack of depth in the treatment of some topics. The author tried to avoid controversial topics by mentioning the various viewpoints offered.

The price of the book is reasonable, the references at the end of each chapter are adequate, and the organization is excellent.

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## Plant Viruses

During the last two decades virology has emerged from a covering of fuzzy concepts and cumbersome methodology to become a distinct discipline and to assume a central position on the stage of modern biology. In **The Biology of Viruses** (Oxford University Press, New York, 1965. 152 pp., \$2), the author, Kenneth M. Smith, portrays this awakening by describing the "life history" or "biographies" of selected plant, bacterial, and animal viruses whose study led to significant discoveries, hoping thus "to preserve some of the romance of scientific research." To accomplish his ends, the author relies heavily on descriptions of plant viruses, devoting 72 of the book's 137 pages to these agents. In contrast, the "biography" of bacteriophages is presented in a mere seven pages. The emphasis on plant viruses seems disproportionate in view of the fact that the ferment generated by studies of T-even bacteriophages laid the foundation for much of modern virology.

Five concise chapters are devoted to descriptions of the viruses that affect man and other vertebrates. These include poliovirus, vaccinia virus, herpesviruses, myxoviruses (chiefly influenza viruses), and some tumor viruses (human warts, mouse mammary tumor, polyoma, and Rous sarcoma). The chapters concerned with animal viruses are brief; the viruses discussed were wisely chosen, and the descriptions are clear although not complete.

There are a number of minor errors of fact which as a whole do not detract greatly from the descriptions presented. However, some major discoveries that contributed to the advancement and to the excitement of virology were omitted, thereby dimin-

ishing the success of the author in fully meeting his objectives. For example, no mention is made of the discovery, by Wyatt and Cohen, that the DNAs of T-even bacteriophages contain 5-hydroxymethylcytosine in place of cytosine, nor is there a description of the subsequent findings that the viral genome can code for the synthesis of a number of new enzymes ("early proteins") as distinct from the viral structural ("late") proteins. No recognition is given to the finding that wound tumor virus of sweet clovers contains a unique double-stranded RNA, nor that double-stranded RNA occurs in only one other group of viruses, the ubiquitous reoviruses which morphologically resemble the wound tumor virus. No consideration is given to Rubin's important discovery that some strains of Rous sarcoma virus are defective and can "transform" cells but cannot replicate to produce infectious virus without the assistance of a helper virus (an avian leukosis virus).

Kenneth M. Smith is an eminent plant virologist, the former director of the Virus Research Unit, Agricultural Research Council, Cambridge, England; it is therefore understandable why he emphasized plant viruses more than all others. It is regrettable that he did not give some formal recognition to the concept that the general principles of virology pertain to all viruses regardless of their host. Hence, the lessons of comparative virology are lost. Nevertheless, he has written a very readable summary of many important discoveries that advanced virology to its present position. *The Biology of Viruses* is not a reference book for the serious student of virology, but it should satisfy the needs of one from another discipline who wishes to be introduced to an important area of modern biology.

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## A Botanical and Ecological Survey of the Outer Leeward Islands

David R. Harris's **Plants, Animals, and Man in the Outer Leeward Islands, West Indies** (University of California Press, Berkeley, 1965. 194 pp., \$5), which is subtitled "An ecological study of Antigua, Barbuda and Anguilla," is a treatment of the past, the present, and the future role of man and other introduced animals and plants in the biological populations on three of the limestone Caribbees. The work is based on 5 months of field study plus investigations in museums and archives in England and the United States and consultations with many specialists in the West Indies. Fourteen figures portray vegetation types, land uses, or geologic characterizations of the three islands. Six tables list rainfall records, compare systems of vegetation classifications of the authors, Beard and Loveless, and present the composition of floristic areas in alphabetically arranged species lists. Two large appendices summarize the botanical content, citing the species mentioned in the text in systematic arrangement by family and by the common names in alphabetical order, each with cross references. An excellent bibliography cites published and unpublished reference materials. The plates with one exception illustrate the types of vegetation or specific plants.

The author's bold premise is that in

the outer Leeward Islands climatic contrasts are insufficient to explain the distribution and diversity of the present vegetation. This he maintains has been profoundly modified by man and cannot be understood without a knowledge of his occupation and use of the islands. Thus, in describing the existing vegetation, Harris indicates its current use and attempts to assign either a native or an alien origin to each species. A special category of alien plants is also recognized, and food crops, other useful plants, ornamentals, grasses, and herbaceous weeds are listed in tabular form, with their suggested areas of origin. For historical perspective, the past is presented as three eras: aboriginal times, the period of the explorers and buccaneers, and early (1632 to 1700), mid (1700 to 1850), and late colonial (1850 to 1960) times; for each period there is a discussion of plants and animals introduced and of the associated land use and misuse. The information is well documented, extremely interesting, and not available in any other single source. The author is encouraging with respect to the future but unconvincing in his conclusion that "with increased understanding of ecological processes, it is now possible to reverse the downward trend of centuries and restore to the islands some of the or-