ognized characteristics. Four genetic linkage groups are recognized.

The extensive presentation on psychogenetics demonstrates that interest in the genetics of the rat has centered largely on its learning abilities and emotional characteristics; 32 pages are devoted to emotionality, 61 to cognitive ability. In these areas Robinson has if anything over-reported early noncritical work, but has also done an excellent job of bringing the reader up-to-date on recent experiments.

The book suffers from a prolix style; one suspects it could have been 100 to 150 pages shorter. Interpretation of many studies—for example, those on tumorigenesis and tissue transplantation—show deficiencies in the author's familiarity with general principles established through work on other species. Nevertheless, the reader who brings to this book his own specialized analytic capacity will find here a source of extremely useful information, clear summaries of experimental protocol, and considerable common-sense deduction. It is a valuable reference work for all workers concerned either with the laboratory rat or with mammalian genetics.

ELIZABETH S. RUSSELL
Jackson Laboratory,
Bar Harbor, Maine

Entomology

The Humicolous Fauna of South Africa: Pselaphidae and Catopidae (Coleoptera) [*Memoir 15*, Transvaal Museum, Pretoria, South Africa, 1964. 261 pp.], by R. Jeannel, is a taxonomic treatise on two families of beetles that primarily inhabit the humus of the forest floors of South Africa. Ten new genera and 104 new species in the Pselaphidae and two new genera and 12 new species in the Catopidae are described. Where necessary all new genera and species are integrated in keys. The monograph is copiously illustrated; of especial value are the figures of aedeagei. The work should prove to be indispensable for those who are studying these families in the area covered. Of great service to such workers are the redescription and illustration of species briefly described by other entomologists many years ago.

Many of the collections suggest that quite a few species are altitude-dependent. Where distribution is discussed, Jeannel has incorporated the data on taxa into a web of southern dispersal routes. According to Jeannel, the faunas of Africa and Madagascar were once in a connected part of Gondwanaland in the Secondary, and various stocks reached austral Africa from South America by a South Atlantic land bridge in the Tertiary. This bridge, according to the author, could have been part of a large Paleoantarctic continent which incorporated Australia, New Zealand, austral Africa, and austral South America.

ORLANDO PARK
Northwestern University,
Evanston, Illinois

Botany

Underlying the extension of geographical range for any species is some means of dispersal. It is fortunate for the biological world that C. T. Ingold has been so keenly interested in the varied mechanisms of dispersal displayed by fungi and bryophytes. His concern has culminated in this recently published, scholarly, and extremely readable volume, **Spore Liberation** (Oxford University Press, New York, 1965. 220 pp., $5.60).

The treatment is based on the premise that fixed organisms must rely on detachable units for dispersal and that essentially nearly all spores are dispersive units. The discussion is divided into eight sections: seven devoted to fungi and one to bryophytes. Neither subject represents a revision of earlier publications by the author. Each is an up-to-date presentation, well documented by references, and the author frequently calls attention to areas that need more investigation.

Ingold's discussion begins with a general account of fungus spores, the role of size, general principles of air transport, and the relation of shape to dispersal. Water-relations in terrestrial fungi and rhythms of spore liberation are treated in separate sections. From general aspects of fungus spore liberation, the author proceeds to the particular. The Mucorales, Sordaria, the toadstools (*sic*), and the Gasteromycetes are given individual consideration. Structurally similar forms may have quite different liberation patterns, as Ingold illustrates strikingly in the case of the Mucorales. In the discussion of the toadstools it is heartening to see basidia illustrated in their proper position. In considering the means by which basidiospores of the ballistospore type are released, Ingold mentions a theory recently proposed by L. S. Olive. A mention of D. B. O. Saville's subsequent extension of this theory might have been appropriate because no single theory seems satisfactory as an explanation of this phenomenon. Ingold sees the structural development and spore liberation patterns of the Gasteromycetes as ecological adaptations to climate. Among their five types of spore release, one, the splash-cup method, is unique among fungi, although it occurs in a lichen, several bryophytes, and angiosperms. It was first described by G. W. Martin in 1927. Later it was studied in elaborate detail by A. H. R. Buller and H. J. Brodie, as Ingold relates.

In the final discussion on bryophytes, Ingold points out mechanisms common to them and some fungi. He concludes the discussion with a comparison of the display of brightly colored tissues in a coprophilous moss and a Gasteromycete, which is suggestive of entomophily in higher plants.

In sum, this book is impressive for breadth of material and careful detail; the illustrations, most of which were prepared by the author, are excellent. The book represents a significant contribution which is especially commendable for its lucid account of highly specialized devices.

GLADYS E. BAKER
Department of Botany,
University of Hawaii

Animal Viruses

Thomas M. Bell's book, **An Introduction to General Virology** (Lippincott, Philadelphia, Pa., 1965. 292 pp., $7.50), provides general information on the aspects of virology that deal chiefly with animal viruses. The title of the book is misleading in that it does not emphasize plant, insect, and bacterial viruses. Hence, the title should be "An Introduction to Animal Virology."

The author has provided a book that will meet the needs of those who work in the allied field of health sciences and desire a background in virology. The book will also serve the graduate student in biological sciences as an adequate supplement to the different types of textbooks that are available.

The aim of the book is served because it provides sufficient, but not detailed, information on the general prin-

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.

HUNEIN F. MAASSAB
Department of Epidemiology, University of Michigan

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 diminishing 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.

HAROLD S. GINSBERG
Department of Microbiology, University of Pennsylvania School of Medicine, Philadelphia

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-