chemical structural systems and R_f values for a large number of substances associated with lichens, Shibata has rendered a valuable service. Miller has provided details of biological assay systems for kinetin and kinetin-like compounds. His principal concern is that the procedures he describes be used in searches for kinetin-like activity in plant extracts. The tests presented should serve satisfactorily for such surveys. Adequate chromatographic and colorimetric tests for kinetin have been developed, but Miller cautions that really satisfactory chemical methods for kinetin-like compounds wait upon future analytical methods.

Knapp gives a comprehensive treatment of methods used in work on the gibberellin family. His description is thorough and brings together a wealth of information in tabular form. Braun's article on plant toxins provides a catalog of low, medium, and high molecular-weight toxins. Several of the high molecular-weight toxins are treated in detail. Enough examples are given to furnish a usable guide for future work. In a thorough review of the world literature on erythrocyte agglutinins produced by plants, Tobiska performs an admirable job of bringing together the widely scattered literature on the subject.

In recent years, an enormous amount of attention has been given to isolating and analyzing bacterial cell walls. The scope, objectives, and general methodology are well presented by Zilliken and Lambert. While it is likely that relatively few bacteriologists will own this volume, physiologists who are concerned with algae, fungi, and higher plants will profit from the described procedures.

The last 200 pages are devoted to general methods of enzymology and to methods of preparing, purifying, and estimating metabolites by enzymatic means. Individual groups of enzymes will be covered in another volume.

Heinen has contributed a chapter on the nature of enzymatic activity, a second chapter on the general characteristics of enzymes, and, with Linkens, a chapter on the Thunberg technique. Tracey writes perceptively on the interpretation of results from enzymatic experiments. Sanwall reviews and evaluates general methods of preparing tissues, cells, and subcellular particles for enzymatic assay. His chapter is logically followed by the chapter in which Bowman and Björk consider purifying and characterizing enzymes. Bowman then draws on his extensive experience and, in a separate chapter, ably discusses the several approaches to purifying enzymes by means of ion exchange chromatography. A valuable, though, in some sections, slightly dated chapter (by Bendall) on the inhibition and activation of enzymes is included.

The final two chapters are on the use of enzymes in estimating amino acids, keto acids, coenzymes, and respiratory intermediates.

The detailed German-English and English-German index contributes greatly to the usefulness of the volume.

This volume merits a place alongside its predecessors in the series. It is of value not only to plant physiologists but can be profitably used by all who are actively working on biochemical aspects of physiology.

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Nematodes

Systema Helminthum. vol. 3, *The Nematodes of Vertebrates*. Satyu Yamaguti. Interscience (Wiley), New York, 1962. 1261 pp. Illus. $90.

Satyu Yamaguti, a well-known parasitologist, whose primary interest is trematodes, has described numerous genera and species of nematodes in this work, the third volume of a series in which the author plans to cover "all the known parasitic worms in the world." Volume 3 is divided into two parts. Part 1 begins with a 6-page account of the general morphology of nematodes; this is followed by 673 pages of keys and diagnoses. Part 2 contains a 23-page outline of the author's system of classification, 213 pages of references, 102 plates (909 figures), and a 136-page index.

The classification is divided into parts that treat the nematodes of fishes, amphibians, reptiles, birds, and mammals; each part begins with a table of contents which is followed by a key to the orders of nematodes from the particular group. An order diagnosis, key to families of the order, family diagnosis, keys to genera, generic diagnosis, and a list of species follow. The characters used in the keys are chosen for expediency. Diagnoses are concise, usually adequate, sometimes without differentiating characters; some genera are separated on the basis of host classification rather than according to morphological characters. Orders with *idea* endings, following Baylis, 1926, are used instead of superfamilies as used by Yorke and Maplestone (1926) and by B. G. Chitwood (1937), whose classification is the generally accepted standard for modern nematode taxonomists. Yamaguti's new taxa include 8 orders, 6 families, 20 subfamilies, 12 new genera, some new species, and some new combinations.

The figures, photocopies of original illustrations, are greatly reduced; sometimes they are excellent, sometimes poor. Figures of pertinent details—for example, of the esophago-intestinal complex of anisakids—are lacking. The figures are grouped on plates according to the host in a random fashion, and related genera and species are sometimes widely separated. This arrangement does not allow one to quickly classify specimens according to groups. The bibliography is up to date, and its coverage is extremely inclusive. The usual typographical errors are present, some unfortunately in scientific names, especially on the explanation of plates.

Yamaguti has improperly revived *Tropisurus* Diesing, 1835, for *Tetrameres* Creplin, 1846; and I can find no justification for his use of *Filocapsularia* Deslongchamps, 1824, for *Anisakis* Dujardin, 1845, since larval forms of both *Porrocaecum* sp. and *Contracaecum* sp. have been reported from the type host. He has improperly amended the following names, changing *onch* to *onc: Haemonchus, Onchocerca, Onchocercella,* and *Paronchocerca.*

Although Mirza (1957) emphasized the morphological similarity of the species of *Dracunculus*, Yamaguti has divided the genus into *Dracunculus* (mammals), *Ophiodracunculus* (snakes), and *Chelonidracunculus* (turtles). The artificiality of his keys sometimes results in placing species incorrectly—for example, *Monodontus floridanus* in *Necator.*

Despite the above criticisms, the enormous value of this concise two-volume work can not be overemphasized. To the serious worker and to the novice, the volume will be of inestimable value.

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