Book Reviews

Trace elements in plants and animals. Walter Stiles. Cambridge, Engl.: at the Univ. Press; New York: Macmillan, 1946. Pp. xi+189. (Illustrated.) $2.75.

In the past two decades a tremendous literature has been amassed around the subject of so-called trace elements in soil-plant-animal interrelations. A recent compilation of abstracts includes over 7,000 references to published articles. Different as the approaches and points of view of these diverse publications are, they deal with several inorganic elements, all of which are involved in the economy of the living organism in very minute amounts.

It scarcely requires mention that so vast a literature is hardly manageable not only by the student of general plant and animal physiology but even by many workers in the field. Prof. Stiles has attempted to prepare within the limits of a small monograph, a digest of the significant developments in this field of knowledge. He has succeeded admirably in this undertaking and has produced a concise and lucid review of the salient facts underlying both the laboratory and the field aspects of the subject.

Following an historical introduction, thorough treatment is given analytical methods and nutrient culture procedures, so crucial in a field of experimentation in which micrograms and parts per billion are common units of measurement and distilled water and CP chemicals are almost invariably "contaminated" and cannot be used without further purification. The author has wisely stressed principles rather than minutiae of procedure, yet his discussion is thorough. In discussing micronutrient deficiency diseases of plants, individual sections are devoted to manganese, zinc, boron, copper, and molybdenum. In the chapter on animal nutrition, attention is given to disturbances traceable to either excess or deficiency of an element. Considerable space is assigned to the functional aspects of micronutrients as reflected by reciprocal relations of different nutrients. An extensive, yet selective, list of references is appended.

The discussion of functional aspects reflects the inadequate state of knowledge of this phase of the subject. Whatever precise information is available comes from the enzyme chemists concerned with metalloproteins. More generous treatment could have been given to the copper enzymes, with a discussion of laccase and ascorbic acid oxidase. The author, however, seems to have in general placed the biochemical aspects of the subject beyond the scope of the monograph.

It would be unreasonable to expect more material within the covers of so small a volume, yet the reviewer cannot refrain from wishing the author had considered some criteria for including a given element in the list of essential nutrients. Proposals will, no doubt, be made in the future for enlarging the list of essential elements, and the judicious evaluation of evidence in the light of some definite criteria of essentiality would be helpful.

These remarks are in no way intended to detract from the value of the book to investigators and students of soil science and plant and animal physiology. The monograph should also prove of importance to biochemists as a useful and concise review of interesting problems in inorganic nutrition which as yet await elucidation.

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Gall midges of economic importance. H. F. Barnes. London: Crosby Lockwood, 1946. Vol. I: Pp. 104; Vol. II: Pp. 160. (Illustrated.) 12/6 and 15/–.

These first two volumes of a series designed to cover a comprehensive study of the gall midges of the world are subtitled *Gall midges of root and vegetable crops* and *Gall midges of fodder crops*, respectively. Volume III, *Gall midges of fruit*, and Volume IV, *Gall midges of ornamental plants and shrubs*, are to be published later. The author also projects subsequent volumes on gall midges of trees, cereals, weeds, miscellaneous crops such as beverage plants and herbs, and midges which are zoophagous and fungivorus.

C. T. Gimingham, of Harpenden, gives a foreword to the series in the first volume, and each volume has a special introduction as well as a very complete list of the literature of the subject matter, which is materially enhanced in usefulness by an index to gall midge names, a plant index, and a general index. Over 60 species of midges are covered in the first volume, while more than 160 species are included in the second. The writing is smooth and pleasant, making the books very readable. Each volume is complete in itself.

Gall midges include such insects as the Hessian fly, chrysanthemum midge, pear midge, clover seed midge, and many other important midge pests which the author still recognizes as the Cecidomyiidae but which in America we generally term the Itonididae. Generally speaking, the family is herbivorous, but a considerable number of the species are zoophagous.

The material is arranged under the food plants, which appear in alphabetical order. Although the less important insects are not set off distinctly, the index helps to overcome this difficulty. This fault, however, makes the books less valuable as a reference work. The arrangement of items under the important species of insects is excellent. First, there is a paragraph on diagnostic characters, which is followed, in order, by a general description, a complete distribution, and paragraphs on life history, food plants, natural enemies, and control. The author closes each volume with a reference to specimen material used and cites the more important literature relating to the species.

There are a number of illustrations, mostly photographic, with some colored plates, but these do not add much to this excellent work. Barnes has brought together a wealth of information in a group generally neglected by economic entomologists, and his work should be a stimulus to others to investigate the Itonididae.

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