tributors are British or European but Australia, New Zealand, and Canada are also represented. The editors are professors of agricultural botany and agriculture, respectively, at the University of Nottingham. The contents are arranged in six general categories: vegetative development, reproductive development, the environment, responses to the environment, biochemical aspects of quality, and agronomic aspects. Most of the 22 papers are of an agronomic nature or have an agronomic orientation toward morphological or physiological aspects of plant growth. Considered from a botanical standpoint, the primary emphases of the papers are as follows: 6 are morphological, 11 physiological, 3 agroecological, and 2 agronomic.

The morphology papers are primarily developmental in approach. Such a paper is "Development of the inflorescence in Gramineae" by R. F. Williams. D. M. Calder discusses "Inflorescence induction and initiation in the Gramineae." A subject of general interest is covered by P. S. Wellington in his article "Germination and seedling emergence." One of the papers on physiology is "Mineral nutrition of grasses and creals" by R. H. M. Langer.

Although it seems unnecessarily expensive, the book is attractively bound and printed. It should prove helpful as a reference work for agricultural scientists and others interested in grasses.

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Faunas of Tennessee

Upper Cambrian Trilobite Faunas of Northeastern Tennessee (Smithsonian Institution, Washington, D.C., 1965. 150 pp., $3) by Franco Rasetti, constitutes a significant contribution to the knowledge of Upper Cambrian trilobite taxonomy and biostratigraphy of the *Cedaria, Crepicephalus,* and *Aphelaspis* faunas.

To accomplish his intent "both to describe the fossils and to present them in their proper setting," Rasetti collected trilobite faunules, almost literally bed-by-bed, from 21 stratigraphic sections in eight Tennessee counties and from one bordering county in Virginia. No map of any sort is provided, but the geographic position of each *collection* is identified by coordinates in millimeters, measured from the southeast corners of 14 recent U.S. Geological Survey 7½-minute quadrangles. This makes it possible for future workers to return precisely to Rasetti's localities, a spectacular advance in providing critical information, but to fully appreciate the geographic relationships of the collections, the reader would need a ballroom or a basketball court as a map table.

The elaborate coding system invented by Rasetti for identifying each collection presages trouble in the future. Not only is the system an invitation to copying and typographical errors (cnn/4, cnq/4, cnq′/4, cnq″/4, cnr/4, cnr′/4), it conveys subjective conclusions. In Rasetti's words, "it was attempted to designate by the same letters correlative beds in the different sections," and "collections designated by cna to cne belong to the *Cedaria* zone, cnk to cnn to the *Crepicephalus* zone, and cno to cnx to the *Aphelaspis zone.*" Furthermore, "the letters cn (for Cambrian, Nolichucky)" are applied also to collections declared by Rasetti to be from the Maryville formation (cnc/2 to cnc/5). Both formational and zonal assignments are individual judgments, almost universally under debate and inherently ephemeral. Identification of basic data should be as objective as possible.

Rasetti has described and illustrated 82 named species, 32 of them new, assigned to 39 genera, 4 of them new; a residuum of 11 undetermined species that are assigned to genera, 2 undetermined cranidia, and 2 undetermined pygidia complete the systematics. The plates are esthetically pleasing, and the photographs meet Rasetti's high standards, but his sharp lighting—which results in excellent modeling—preserves detail only in the middle tones. Although Rasetti has intimated elsewhere that he has taken stereophotographs, there are none in this publication. Many specimens are illustrated by three views; in my opinion a stereo pair gives a far better impression of the relationships of the parts to the whole.

Unhappily Rasetti follows A. R. Palmer, who stubbornly refuses to cite properly his paper on the faunas of the Riley formation in central Texas. The verso of the title page of volume 28 of the *Journal of Paleontology* records the fact that No. 6 (November 1954) was mailed 15 January 1955, and that date, according to the International Code of Zoological Nomenclature, is the date of origin of Palmer's new taxa. Research on these Croixan faunas is active, and already Palmer's taxa have been cited as either 1954 or 1955 in several papers.

Rasetti makes considerable use of physical association of specimens, and their stratigraphic distribution, to assess morphologic variability characteristic of a taxon. With this practice I heartily agree.

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Marine Isopods

Handbook on the Common Marine Isopod Crustacea of Georgia (University of Georgia Press, Athens, 1966. 101 pp. Paper, $2.50) by Robert J. Menzies and Dirk Frankenberg is an attractive small volume intended for the use of senior students and investigators. It is the first such work to be based on the invertebrate collection made by the great collector, Milton B. Gray, for the Sapelo Island Foundation.

The authors have abridged their volume by leaning heavily on clear line drawings. In a six-page artificial key, many references are made to a plate of figures illustrating key characteristics. Also, 27 pages of figures are used to supplement the diagnoses of 30 species of isopods, including ten new species. A map and a six-page station list show collection stations off the coast of Georgia. There is a brief discussion of the distribution of the 30 species; Forbes's concept of twin Atlantic and Pacific species formerly used for decapod Crustacea is applied to the Isopoda and demonstrates that there are closely related species in both oceans. There is a good working bibliography.

In their systematic treatment, the authors admit that they have compensated for their "extraordinarily short" species diagnoses by using a considerable number of descriptive illustrations. I feel that their diagnoses definitely need more textual explanation, because, as the authors themselves indicate for such stalwarts of crustacean taxonomy as Stimpson, Harger, Richardson, and Barnard, differences of interpretation may result from illustrations not accompanied by adequate textual descriptions. Also, although maps and extensive sta-

tion lists are included for strictly marine species, there are no maps that show collection locations for species living in tidal creeks and marshes. Six pages are devoted to a list of species of isopods described by Richardson (1905) that might be found in Georgian waters, but the synonymy of many of her species has changed so with time that the list will be of little use to any except experienced investigators. It is hoped that small errors, particularly those in generic descriptions, will be corrected in future printings.

This volume will be very useful. I commend the authors for their pioneering effort and trust that they will continue their work and that others will follow them.

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Plant Science

Diagnostic Criteria for Plants and Soil (Division of Agricultural Sciences, University of California, Berkeley, 1966. 799 pp., $17.50), edited by Homer D. Chapman, is a compilation, by the staff of the University of California, of information concerning tissue analysis and its importance as a means of diagnosing nutritional disorders in plants, the fertility status of soils, and the methods of dealing with them. Essentially it is a handbook arranged chapter by chapter according to the chemical elements, aluminum through zirconium; it is concerned with chemical imbalance in plants and contains additional chapters that treat the total salt and water content of soils, the alkaline and saline soils, and organic soil toxins. The book contains a vast amount of empirical information that will be of use to a broad audience.

The author of each chapter was given a basic format to follow but could take considerable liberty in deviating and including additional information such as plant functions or soil-plant interrelations. Most chapters contain a table entitled "Tissue analysis values useful in indicating chemical status," arranged according to a vast variety of plants. The chemical status in the plant is indicated in parts per million or percentage of dry matter, and the concentration at which deficiency or toxic symptoms occur is given. Each table contains explicit references for all items listed. Appendix I presents the same information in tabular form, except that it is grouped according to the plant rather than according to the chemical, as in the individual chapters. Each chapter provides a discussion of the chemical control of the particular element in the soil. The interrelationships of various chemical elements are clearly described.

Excellent halftones (which are supplemented by a few color plates) show photographically the symptoms of chemical toxicity. Although many modern techniques are mentioned as contributing information concerning the chemical constituents of plant tissue, certain obvious modern techniques for recording the plant symptoms are not discussed. Neither infrared photography nor infrared radiometry is mentioned. Nor is there mention of diagnostic techniques of spectrophotometry, a technique that may prove to be extremely useful. This is probably because many of these techniques were not used in the field of plant nutrition prior to 1960, which was the cut-off year for inclusion in the bibliography for this book. However, the appendix contains references to papers published in 1964.

The book is an indispensable reference tool for most research workers and students of plant science. Whether one wishes information about seleniferous forage plants, aldehydes in toxic desert shrubs, amino acid inhibition, or all types of chlorosis, the facts are available in this compilation. The book is sturdily bound and printed on high-quality slick paper.

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Indian Ocean Community

A man may feel loyalty to a sea as well as to a land, and Auguste Toussaint, the author of **History of the Indian Ocean** (University of Chicago Press, Chicago, 1966. 304 pp., $6), is an Indian Ocean patriot. When he complains—correctly—that the Indian Ocean has received less than its share of attention from historians, it is with a sense of patriotic indignation as well as of intellectual regret. Toussaint comes from Mauritius, one of the many crumbs of land in the Indian Ocean which belong neither to Africa nor to Asia. It is understandable that Toussaint, a Frenchman, living in a British colony which is close to Africa but chiefly inhabited by the descendants of Indian coolie immigrants and, with independence, about to be governed by them, should think of himself as a citizen of the Ocean and should look to an Indian Ocean community as the best form of political insurance for the future.

Alas for noble dreams. Since Toussaint's book was first published, in French in 1961, Indonesia has confronted Malaysia, the Chinese have invaded India, Zanzibar has been engulfed by Tanzania, formerly its reservoir of slave labor; and despite the bromides of Bandung, an Indian Ocean community seems more remote even than it did 5 years ago. Nevertheless, Toussaint thinks it too early to despair, and still appeals to history for evidence of oceanic unity. His book, however, is less a history of the ocean than a history of European activities there. Of its 15 chapters, the first is a geographical description, the next five condense the story of all the civilizations bordering on the ocean down to 1500, the remaining nine deal with a succession of European political and commercial empires. The five chapters are too sketchy and episodic to be much help to the ignorant. The nine, on the other hand, are competently done, if at times a trifle sententious, and they contain some arresting mnemonic phrases that have survived translation. Toussaint has a sound understanding of economic realities and the economics of long-haul transport, and he describes them neatly. His book is disappointing, however, on strictly nautical matters. He pays due respect to M. Poujade's wide archeological learning and to Commander Villiers, who knows Indian Ocean shipping at first hand, but his own account of local ship types is unsatisfactorily vague. The reader is left wondering whether Toussaint has ever seen a lateen-rigged craft, much less handled one.

Mention should be made of a brief but interesting appendix on the islands of the southern Indian Ocean, and of the translation, by June Guicharnaud, which is smooth and workmanlike, if at times a little pedestrian.

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