teachers, landscape gardeners, forest farmers, and research workers throughout the country.

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Encyclopedia of Plant Physiology. Edited by W. Ruhland. Vol. 14. Growth and Growth Substances. 1357 pp. illus. Berlin, Springer-Verlag, 1961. DM 355.

In 1955, Springer-Verlag, the largest publisher of scientific books in Europe, requested the late Professor Ruhland to edit an *Encyclopedia of Plant Physiology*. The encyclopedia was to consist of 18 volumes divided into three sections: "General Foundations" (2 volumes), "Metabolism" (11 volumes), and "Growth, Development, and Movements" (5 volumes). At this writing, most of the volumes have appeared, the one under review being Volume 14, the first of the section on growth. Prof. Hans Burström (Lund, Sweden) served as sub-editor for this volume.

The general plan of organization followed in this and other volumes of the *Encyclopedia* is to have a series of topics within the field discussed by leading authorities. Individual contributions are in German, French, or English. When the topic, e.g., "The Chemical Regulation of Growth," is broad, there may be subdivisions and subsections, each written by a different specialist. Thus, there are over 30 chapters on auxin in which are discussed synthesis, destruction, estimation (biological and chemical), metabolism, etc.

It is obviously impossible to review an undertaking of this magnitude in the manner one reviews a book by a single author and on a restricted topic. The size of the series, its mere bulk on a library shelf, and the weight of even a single volume, preclude this approach. Yet, a simple cataloging of the contents of the volume on growth substances is neither adequate nor fair to the potential audience for this and other volumes of the *Encyclopedia*. The *Encyclopedia* is, in short, a monumental job, expertly done, virtually free of avoidable errors, and an absolute necessity for any library that serves research workers, teachers, or graduate students in any phase of plant science. This volume on growth substances is, like the others, an exhaustive compendium of the research, concepts, and methodology of plant hormones. The labor of the editorial staff, the authors, and the publisher can scarcely be imagined, and the resulting encyclopedia will be used for many, many years.

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Lichens for Vegetable Dyeing. Eileen M. Bolton. 63 pp. illus. Charles T. Branford Co., Newton Centre, Massachusetts, 1960. $3.50.

A neat and beautiful little volume, *Lichens for Vegetable Dyeing* is packed with information of practical and academic interest. Designed "specifically for students, teachers and amateur weavers," the book purports to be—and is—a kind of handbook "of which there is nothing comparable currently available." The author's preface sets a brisk and businesslike tone for the book; and the introduction explains the general organization of the six chapters, the appendix, the bibliography, and the index.

At a time when lichens are being accorded much serious research attention as the source of interesting new antibiotics and other chemical compounds, it is refreshing to look back and evaluate with the author the ancient and important role which these plants have played in dyeing. Chapter 1 introduces the reader to the great antiquity of lichen dyes, while the next chapter succinctly describes the biology of lichens and how to gather them. There follow four chapters dealing with the morphology and classification of the orchil-producing lichens; the morphology and classification of the boiling-water lichens (including rare species which give dyes); the extraction of orchil dyes; and the extraction of dyes with the boiling-water method. The appendix consists mainly of a list of lichen acid constituents of the species discussed. The bibliography is short. One might wish for a somewhat more inclusive list of reference works, but there can be no doubt that the list provided is adequate for the purposes of the book.

All told, 14 species of lichens in ten genera are discussed. The book is accurate from the scientific point of view, yet written so that it may be of interest and use to amateurs not trained in botany or in chemistry. Not the least to be praised in the book are the six really extraordinary full page colour

plates masterfully reproduced. Five of these are illustrations of lichens painted by the author herself, and the frontispiece, as striking as it is utilitarian, is a colour photograph of 21 samples of dyed fleece. A word of highest praise should be given to the publishers, Charles T. Branford Company, and to the printers, Fabbristampa of Milan, Italy, for a thoroughly pleasing format and artistic production.

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Alkaloid-Bearing Plants and Their Contained Alkaloids. J. J. Willaman and Bernice G. Schubert. 287 pp. Technical Bulletin No. 1234. Agric. Res. Service, U.S.D.A. Washington, D. C., 1961. $1.00.

Any worker interested in plant constituents will certainly want to examine this useful publication. The material presented is arranged in the form of two tables preceded by five pages explaining the reference codes employed in Table 1.

Table 1 occupies 230 pages, and each of these pages is divided into four columns with appropriate headings. The column to the left contains the plant names arranged alphabetically by family and under each family alphabetically by genus. In the next column to the right the plant part for each entry is indicated. The third column contains the names of the alkaloids or an indication of an alkaloid or alkaloids not named in the article to which reference is made by code in the fourth column. The table includes about 400 species of plants. Table 2 occupies 86 pages bearing tabulated information consisting of the names of the alkaloids arranged alphabetically, chemical formulas, and the plant entry numbers from Table 1.

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Wurzelatlas mitteleuropaischer Ackerunkrauter und Kulturpflanzen. L. Kutschera. 574 pp. illus. DLG-Verlags-GMBH, Frankfurt am Main, 1960. DM90.

In more than 250 figures (drawings by Lichtenegger) this work illustrates the root systems of many central European weeds and herbaceous agricultural plants. Fifteen chapters on the morphology and anatomy of the root and on environmental factors introduce the main part of the book. In several sources, such as floras, descriptions of aerial parts of the various species can be found. It is the author's intention in the *Wurzelatlas* to round out the description of species by providing illustrative and textual material on the roots and to discuss the bearing that root structure may have on distribution, habitat, and phytocoenological connections (*soziologische Bindung*) of the species. Most of this book is devoted to detailed explanation of the excellent figures. Each illustrated plant is accompanied by notes on range, soil characteristics, etc. The descriptions of soil profiles employ terms of Kubiena. Studying the roots *in situ* (reminiscent of the work of J. E. Weaver), Mrs. Kutschera could detect distinguishing features of the various species. Plants belonging to different families, but occurring in the same ecological niche, often posses similarly constructed root systems. In agreement with Mrs. Kutschera, we should like to see such study carried out on additional species. Some important and widely cultivated plants (such as *Linum usitatissimum, Lupinus* spp., and *Ornithopus sativus*) and several troublesome weeds (e.g., *Allium vineale, Bromus secalinus, Alopecurus myosuroides, Chenopodium ficifolium, Antirrhinum orontium,* and *Chrysanthemum segetum*) are not included in the book. Mrs. Kutschera, carrying out her researches chiefly in south-central Europe, also visited the United States and got significant data there. But perhaps she should be invited to study at a north-central European ecological institution.

The *Wurzelatlas* is of great value for agronomists, ecologists, and soil-scientists. With this aid we are able better to understand the habitat requirements of widespread cultural and weedy plants. The comparisons that the book gives with figures of other authors is very instructive. Doubtless we do not yet know enough about the variability of root-systems of our cultivated and weedy plants. Missing in the book is information on geographic, subspecific, and man-induced differences (polyploids) of the treated species. These details, which would be of significance and interest, could easily be added in a second edition. In one chapter of the introduction there is given a summary