

Book Reviews

Botany

WHAT PLANTS PRODUCE. HOW PLANTS ARE MADE. and HOW PLANTS MAKE FOOD

(three volumes) by Martin J. Gutnik. 1976. Childrens Press (1224 West Van Buren Street, Chicago, 60607). 48 p., 43 p., 45 p. \$4.95.

The subject matter of these three books is clearly indicated in their titles. Although they seem not to have been written as a series, they lend themselves to use in sequence. Indeed, some existing primary school science programs may well be improved by adding one or more of these books to the curriculum.

All three books share two basic strengths. First, they take seriously the importance of plants in the ecosphere (and thus in the lives of people). Second, the experiments suggested for young students are interesting, understandable, and supportable within any reasonable budget.

The importance of plants is clearest in Gutnik's discussions of how plants produce sugar, and thus all food. He also emphasizes their role as oxygen producers. In many science curricula, these contributions of the plant world are inadequately stressed, to the extent that many college students taking general biology under-appreciate the importance of plants.

The experiments are well-organized and relatively easy to complete. For each one, the following format is provided: (a) an introduction of the idea to be tested by the experiment, (b) a list of supplies, (c) an imitable description of how another young person performed the experiment, and (d) the results to be expected and the teacher's interpretation of those results. Additional good points include ample and artful illustrations, and a glossary of terms relevant to the subject matter. All three books end with an explanation of photosynthesis, thus placing earlier material in its larger context.

What Plants Produce is the most elementary and would be best used in the lower grades. Two aspects of photosynthesis are introduced: the production of oxygen and of carbohydrates. Only two simple experiments are included.

How Plants Are Made and *How Plants Make Food* are both for about the upper primary level. It is useful to note that

How Plants Are Made focuses more on observational skills with the use of magnifying instruments and *How Plants Make Food* gets the student more into the experimental process, illustrating that some results take time.

How Plants Are Made describes basic features of leaves and roots through use of four exercises. An improvement would be to substitute one of the existing exercises with one introducing the stem and to show its importance in the structural unity and functioning of the plant. One noticeable error of the book is the illustration on page 19, where branch roots are mislabelled as root hairs. An easier method of observing root hairs than the one given is to sprout radish seeds on filter paper.

How Plants Make Food describes the basic roles of CO₂, water, and light in photosynthesis. Water loss through transpiration is also demonstrated. The book's three experiments get these points across while skillfully including the use of controls.

The creative use of these books and ones like them will yield the kind of learning that helps students become aware and alert citizens, capable of dealing with some basic environmental issues.

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PLANT CELL BIOLOGY: AN ULTRASTRUCTURAL APPROACH

by Brian E. S. Gunning and Martin W. Steer. 1975. Crane, Russak and Company, Inc. 347 Madison Ave., N.Y. 10017. 104 p. \$8.95 paperback.

The format for this atlas of plant ultrastructure is the usual one of printed text on the left-hand page and labeled photographic plate, to which the text refers, on the right-hand page. There are, in all, about fifty such combinations, but the number of separate photographs exceeds 200, there being one to a dozen in each plate. All of the photographs were taken from the larger work, *Ultrastructure and the Biology of Plant Cells* by the same authors, published by Edward Arnold in 1975.

A combination of photomicrographs, diagrams, and photographs of models

are used in combination with electron micrographs to good effect. The techniques of transmission, scanning, freeze-fracturing, and shadow casting electron microscopy are described in the introduction, and numerous examples of their use are seen in the book. The strongest feature of the book, in my opinion, is the presentation of selected cellular structures in developmental sequence. Particularly impressive are the ten plates and sixty-two photographs dealing with plastids and their development. Cell division and maturation of vascular tissue are also treated in a chronological fashion.

Only one irritation presented itself to me, and that was the constant use of double nouns. Such combinations as city council and even electron microscope are hard to avoid, but others such as values clarification or specimen preparation are ungraceful and jargonistic and are not necessary even in technical writing, in which they abound. Examples from *Plant Cell Biology* are: xylem maturation, wall ingrowths, injury-response systems, reticulum cisternae, etc.

The book is a bit advanced or specialized for many uses in schools or colleges, but it and its parent volume can certainly be recommended for those in need of textbooks on plant ultrastructure.

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Ecology and Environmental Biology

PLANTS AND ANIMALS OF THE PACIFIC NORTHWEST

by Eugene N. Kozloff. 1976. University of Washington Press (Seattle 98105). 274 p. \$17.50.

Persons interested in identifying and learning more about the fauna and flora of the lowlands of the Pacific Northwest from Southern Oregon to an area north of Nanaimo, British Columbia, are advised to secure a copy of this informative and well-illustrated guidebook. The book is particularly appropriate for amateur naturalists and is highly recommended for biology, natural history, and ecology students at the high school and college levels. It would also serve as a useful guide for professional biologists or

biology teachers who are reviewing or just becoming familiar with the plants and animals of the Pacific Northwest.

The general natural history of 450 widely distributed species of plants and animals is presented in an interesting manner using vocabulary that, for the most part, is suitable for the nonspecialist. The book concentrates on native species and is substantially complete for vines, shrubs, and trees. Included are most of the ferns and fern allies found west of the Cascade Mountains and selected birds, mammals, reptiles, amphibians, mosses, liverworts, lichens, snails, slugs, millipedes, centipedes, and other invertebrates. Selection was based on such factors as frequency of occurrence, size of distribution, and ease of identification. Excluded are grasslike plants growing in wet places, spiders, most insects, mushrooms, submerged vegetation, aquatic animals, plants that have escaped from cultivation, and all but a few introduced species. Nearly every species discussed is presented visually in one of the 321 excellent color photographs or 125 black and white illustrations. The color photographs and organization of the plants and animals are the book's greatest assets; they provide the nonspecialist with an easy means of species identification. Unlike most guidebooks, plants and animals, with the exception of the vertebrates, are organized around the habitats in which they are likely to be found rather than being placed in keys of related species. The habitats are as follows: coniferous forest, oak woods, rocky slopes, and brushy areas; wet places; and backyards, vacant lots, and roadsides. Discussions of these habitats, along with an introduction and a chapter on vertebrates, form the six chapters of the book. The introduction provides a brief description of the geography of the Pacific Northwest, a section on the metric system, and several conservation tips for teachers. The collective presentation of vertebrates in the final chapter rather than being placed in their respective habitats is the weakest portion of the book. The chapter gives the impression of being an afterthought rather than being an integral part of the guidebook. Discussions of the vertebrates presented are adequate, but the number included is superficial in view of the large variety that exists in the Pacific Northwest. Those that are presented are not accompanied by color photographs. The following reasons are given for such a treatment: other guidebooks are available covering birds; it is impractical to include all species that are abundant; mammals move freely from habitat to habitat; few mammals are distinctive enough to be easily identified in the field; amphibians spend

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part of their lives in one habitat and part in another; and an effort is made to limit the list of species to a number that the beginning naturalist can handle. Even though the chapter on vertebrates is not of the same caliber as the other chapters, overall this is an excellent guidebook for selected plants and animals of the Pacific Northwest.

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LOSING GROUND: ENVIRONMENTAL STRESS AND WORLD FOOD PROSPECTS

by Erik P. Eckholm. 1976. W. W. Norton & Company, Inc. (55 Fifth Ave., New York 10003). 223 p. \$7.95.

This is a reliable reference to environmental crises throughout the world. It is centered on the effect of environmental stress and world food prospects.

The author uses a historical approach to the negative ecological trends throughout the world in deforestation, overgrazing, desert encroachment, soil erosion, flood trends, world fisheries, humid tropics, and salting and silting of irrigation systems. Conclusions are drawn from these data, which were collected to show how these problems relate to world

food production systems. The major obstacles are political priorities and decision making time frames. Emphasis is placed on interconnections of scarcity, ecological stress, and global energy relating to the disposition of world resources.

The reference content is well organized around topical categories, with a bibliography and additional sources. It would be an excellent reference, for it shows extensive research and great insight into the world food outlook and the prospects of ecological stresses.

The book is presented in an interesting format and is very readable. The additional resources are impressive and show extensive research that justifies predictions.

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Educational and Professional Concerns

POWER TO THE TEACHER

by Marshall O. Donley, Jr. 1976. Indiana University Press (10th and Morton St., Bloomington 47401). 223 p. \$10.95 hardback; \$3.95 softback.

Since the establishment in 1794 of the nation's first teachers' association, educators have been torn between a desire to promote and improve public education and a desire to better their own conditions. *Power To The Teacher* documents the decisions that have generated teacher militancy from the early days of "genteel poverty" through the founding of state and national teachers associations and union.

Marshall O. Donley, Jr., currently editor of the *NEA Reporter*, brings to this book a complete collection of historical material on teacher activism. Every teacher with an interest in this aspect of the profession will find the book an informative statement of the evolution of both the National Education Association and the American Federation of Teachers as they have attempted to improve teacher status.

Major concepts presented include the problems in teacher negotiations, the conflict between the NEA and the A.F.T., and the goals of the 2 million members of these organizations. Clashes between administrators and teachers and clashes between conservative and activist factions are included. The book also notes the major problems of salary, tenure, social reform, and personnel practices.

The book reflects the National Education Association's point of view throughout, but presents an entire chapter on union victories in New York City during