

# Book Reviews

## Botany

### BOTANY: AN INTRODUCTION TO PLANT BIOLOGY

by T. Elliott Weier, C. Ralph Stocking, Michael G. Barbour, and Thomas L. Rost. 6th ed., 1982. John Wiley & Sons, Inc. (One Wiley Drive, Somerset, NJ 08873). 720 p. \$24.95 hardback.

This is a comprehensive textbook suitable for a year's course in botany, but containing more material than can be used in a high school or short college course. All aspects of plant science are examined, and many topics, e.g., plant evolution, are presented with unusual excellence. Illustrations are abundant and useful, many of them in good color. Two rather unusual features add to the book's usefulness: 1) an inclusive glossary with origin of the terms; and 2) an index to genera in addition to the general one. Bold-face type indicate illustrations in both indices.

In view of the weight of the book (5 lbs.), waste of space (blank pages and illustrations not pertinent, e.g., fruits at the beginning of the chapter on the metabolic plant cell) between chapters is hard to defend. The book compares favorably with those that I have used or read previously. It should be available to students (on the reference shelf in high schools and colleges with short courses) wherever plant science is taught.

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## Educational and Professional Concerns

### TOWARDS A SCIENCE OF SCIENCE TEACHING: COGNITIVE DEVELOPMENT AND CURRICULUM DEMAND

by Michael Shayer and Philip Adey. 1981. Heinemann Educational Books (4 Front St., Exeter, NH 03833). 159 p. \$12.95 softback.

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This book reports research done in Britain attempting to coordinate the cognitive development of students according to Piaget's schema with the design and selection of curricular materials in the sciences. The authors report a "massive Mismatch" between teacher expectations and the ability of students to assimilate experiences. The book is *must* reading for those interested in Piagetian theory, even though it suffers from a British style of writing and little reference to activities in North America. The book, written for science teachers and science-teacher educators, is very technical and somewhat difficult to read in places.

The first part of the book introduces the problem and provides an overview of the methods used and the results obtained. Part 2 provides more details of the Piagetian framework of the research and the design, development, and use of the class tasks (25 or more students) developed for assessment of cognitive development. Part 3 details the taxonomies developed for assessing the cognitive level of curricular material. Validity and reliability studies are described. The implications of the results are presented in Part 4. The studies are interesting reading and should be replicated in the United States. The authors feel that their group tasks are more reliable than individual tests for determining a student's stage

of cognitive development. The book ends with a discussion of the factors needed to improve science teaching through the application of the techniques described. It includes a good set of references and a valuable index, but lacks a summary or conclusion.

The underlying assumption is that science education could be significantly improved if steps were taken to improve the match between lesson material and the cognitive level of the pupil. The book presents a well-developed method of assessing levels of cognitive development of groups of pupils along with comprehensive data on the British school population collected by the method. In addition, it describes a validated method of analyzing science curricula to establish the levels of cognitive demand may take. However, more information and direction are needed to assist teachers in selecting science materials most appropriate for their students.

The book is informative and provocative, raising many issues and questions. Arguments for and against the application of Piagetian theory are presented. Many charts and graphs are included. One taxonomy describes psychological characteristics of children's thinking at various stages of cognitive development. The second focuses on the intellectual elements or schemas specific to different types of science activities. A training exercise in the use of the taxonomies is included along with the authors' classification of the sample objectives.

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## Evolution

### SOMATIC SELECTION AND ADAPTIVE EVOLUTION

by E.J. Steele. 2nd ed. 1981. The University of Chicago Press (Chicago, IL 60637). 134 p. Price not given.