nology. This book will be an excellent textbook, particularly for the basic course in physical chemistry that follows a modern general chemistry program.

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Interdisciplinary Summary

Water Metabolism in Plants. Theodore T. Kozlowski. Harper and Row, New York, 1964. xx + 227 pp. Illus. Paper, $3.95.

Water is an expendible resource of limited supply. Competition for water in domestic, industrial, and agricultural use is increasing. In many parts of the world land use is limited by water shortage. Consequently, research on ways to promote efficient use and to eliminate waste of water is of vital importance. Kozlowski's *Water Metabolism in Plants* is timely, and it will prove useful to botanists, horticulturists, foresters, engineers, and public officials entrusted with responsibility for just and efficient use of water.

Following a brief introduction in which he cites the principal reviews, Kozlowski discusses xerophytism in some detail, pointing out the various means by which plants endure drought. Water balance in plants is then treated. There are 119 references in chapter 1, 93 of which cite work published since 1949, the publication date of two books which thoroughly reviewed this subject. Similar coverage is provided other topics in subsequent chapters. Thus, Kozlowski's volume is very valuable in its coverage of the current literature.

Chapter 2 discusses water relations of cells and tissues, briefly reviewing classical aspects, and describing current ideas. Terminology is discussed, and methods for measuring osmotic quantities are described. Finally, active water uptake is given detailed consideration.

Absorption of water is covered in chapter 3. Available water and soil moisture constants are discussed, terminology is considered, and water uptake by healthy and by diseased plants is described.

Various theories of water transport are discussed in chapter 4. The pros and cons of the cohesion theory are given. Evidence for tensions in water columns, continuity of water in plants, hydrostatic gradients, and the tensile strength of water is reviewed.

Chapter 5 considers water loss by guttation and transpiration. Factors regulating transpiration are given detailed treatment. Experiments on evapotranspiration are described, and the significance of transpiration in ion uptake, mineral distribution, and mineral loss from plants is discussed.

The effects of water deficits on plants are detailed in chapter 6. Water availability and moisture stress are considered. The effects of water deficit on physiological processes are described. The role of water in plant growth is documented, particularly with respect to trees. As a forester, Kozlowski speaks with authority in this field, and much of the evidence is from his own researches. He is to be complimented for producing a text and reference volume of great usefulness.

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Marine Algae

Seaweed Symposium, Proceedings. The fourth international symposium, held at Biarritz, France, in September 1961. Ad. Davy de Virville and J. Feldmann, Eds. Pergamon, London; Macmillan, New York, 1964. xxiv + 467 pp. Illus. $15.

The volume contains some 80 papers. Two general conferences were presented: "Growing marine seaweeds" by L. Provasoli and "Algal polysaccharides and their biological relationship" by E. Percival. The other papers are about equally divided among the following topics: biology (life histories and taxonomy), ecology, chemistry, and utilization. The reports are mostly in French or English, with a few in German.

Among the shorter papers may be mentioned "Photosynthesis and growth in *Macrocystis pyrifera*" by the late K. A. Clendenning; "Sur un nouveau procédé de cartographie des algues marines" by Davy de Virville; and "Auxins and gibberellins in marine algae" by J. A. Mowat. (The latter does not acknowledge, however, the much earlier work by van Overbeek).

Floristic and ecological surveys include the Southern Gulf of Mexico (H. J. Humm); Vietnam (Pham Hoang Ho); the North Pacific (R. F. Scagel); Yoron Island, South Japan (T. Tanaka); and northwest Greenland (R. T. Wilce). Reports on life history and taxonomy range from phytoplankton through temperate and tropical benthic algae to the giant kelps, in chapters too numerous to cite.

Chemical studies cover nitrogen metabolism, polysaccharides (including the enzymatic transfer of sulfate to these), carbohydrases, bromophenols, ascorbic acid, and the sugar components of phycobilins. There is a discussion of the fatty acids of red algae, as determined by gas chromatography.

Industrial utilization of algae is described in Iceland, Denmark, Poland, Germany, Scotland, Canada, France, and Norway. An interesting British application is described in the paper entitled "Liquid seaweed as a fertilizer."

The book concludes with an appendix, by the Food and Agricultural Organisation of the United Nations, on statistics of the seaweed industries of the world.

There is no subject index.

It is a striking commentary on the increased study of algae that the reports of the international conferences on seaweeds have grown from a small paperbound book issued after the first symposium (Edinburgh, 1952) to this substantial volume. No doubt an even larger book will follow the Halifax conference that is scheduled for 1965—hopefully in less than 3 years after the meetings.

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Nesmeyanov Jubilee Volume

Selected Works in Organic Chemistry. A. N. Nesmeyanov. Translated from the Russian edition (Moscow, 1959) by Avraham Birron and Z. S. Cole. David P. Gelfand, Ed. Pergamon, London; Macmillan, New York, 1964. xvi + 1172 pp. Illus. $30.

Some four years ago it was my pleasure, as a member of the National Academy of Sciences and as Science Adviser to the Secretary of State, to accompany Detlev W. Bronk, who was at that time President of the National Academy of Sciences of the U.S., on a trip to the Soviet Union; the purpose of the trip was to meet with the president of the Academy of Sciences of the U.S.S.R., A. N. Nesmeyanov, and to