

## Marine Botany

**Photorespiration in Marine Plants.** N. E. TOLBERT and C. B. OSMOND, Eds. CSIRO, Melbourne, and University Park Press, Baltimore, 1976. viii, 140 pp., illus. \$19.50. Also published as *Australian Journal of Plant Physiology*, vol. 3.

This book is composed of papers that result from studies of photosynthesis and photorespiration in marine algae and sea grasses that were conducted on board the R.V. *Alpha Helix* during a 1973 expedition to the Great Barrier Reef of Australia. The book includes a checklist of benthic marine plants found in the vicinity of Lizard Island, discussions of the ultrastructure of sea weeds and sea grasses, and analyses of  $\delta^{13}\text{C}$  values and of the enzyme systems operating in the  $\text{C}_3$  and  $\text{C}_4$  pathways of photosynthetic  $\text{CO}_2$  fixation in free-living as well as symbiotic organisms.

A wide range of photosynthetic organisms, from cyanophytes to anthophytes, was investigated. The general conclusion reached—and the overall thesis of the book—is that the  $\text{C}_4$  pathway characteristic of plants with little or no photorespiration does not play an important role in the marine environment, most of the observed photosynthetic  $\text{CO}_2$  fixation being effected through the  $\text{C}_3$  pathway and ribulose diphosphate carboxylase. This thesis is maintained even in light of the demonstration of reasonably high concentrations of reduced nicotinamide adenine dinucleotide malate dehydrogenase with high substrate affinity in several organisms. The possibility that this enzyme might be located within the mitochondria appeared so great, in light of the high sensitivity of photosynthesis to oxygen in most of the organisms studied, that the investigators could not conclude that it was located within the chloroplasts. The possibility that there might be combined  $\text{C}_3$  and  $\text{C}_4$  activities in the plants studied was not considered.

The way some data have been interpreted in this book raises several interesting questions. First, one might wonder how useful the technique of stable isotope fractionation is in studies of systems in which there is diffusion of gases across air-water and water-organism interfaces. The assumptions made in the interpretation of the observed  $\delta^{13}\text{C}$  values were based on past observations of land plants, but the complexity of the  $\text{CO}_2\text{-HCO}_3^-$  equilibrium in the marine environment renders such assumptions suspect. Second, studies of the endosymbiotic dinoflagellate *Symbiodinium* (= *Gymnodinium*) *microadriaticum* were interpreted as constituting a demonstra-

tion of a  $\text{C}_3$  pathway in the organism. On the positive side, this conclusion is supported by the observed  $\text{O}_2$  inhibition of  $\text{CO}_2$  fixation and by the organisms' production and release of glycolate. Nonetheless, zooxanthellae have never been reported to photosynthetically produce serine and glycine, amino acids characteristic of photorespiring plants. In addition, the photosynthetic apparatus of zooxanthellae from different hosts became saturated at different light intensities, but the possibility that these differences were the result of differences in the genetic makeup or physiological adaptability of these algae was not considered.

For those interested in productivity in tropical marine environments as well as in the physiology of photosynthesis, this volume should be interesting reading.

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## Books Received

**Air Pollution.** Vol. 3, Measuring, Monitoring, and Surveillance of Air Pollution. Arthur C. Stern, Ed. Academic Press, New York, ed. 3, 1976. xx, 802 pp., illus. \$42.50. Environmental Sciences.

**Alternative Energy Sources.** Papers from a conference, 1975. James P. Hartnett, Ed. Academic Press, New York, and Hemisphere, Washington, D.C., 1976. viii, 328 pp., illus. \$28.50. A Publication of the International Centre for Heat and Mass Transfer, Belgrade.

**Anatomical Case Histories.** A Problem-Solving Text in Anatomy. Lawrence K. Schneider. Year Book Medical Publishers, Chicago, 1976. xii, 320 pp., illus. Paper, \$8.95.

**Animal Diversity.** Milton Fingerman. Holt, Rinehart and Winston, New York, ed. 2, 1976. vi, 252 pp., illus. Paper, \$5.

**Bigotry and Blood.** Documents on the Ulster Troubles. Charles Carlton. Nelson-Hall, Chicago, 1977. xxii, 160 pp. \$8.95.

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**Building Techniques.** Vol. 1, Structure. Harold King and Denzil Nield. Chapman and Hall, London, and Halsted (Wiley), New York, ed. 3, 1976. xvi, 228 pp., illus. Paper, \$7.95.

**Can Desert Encroachment Be Stopped?** A Study with Emphasis on Africa. A. Rapp, H. N. Le Houerou, and B. Lundholm, Eds. Swedish Natural Science Research Council (NFR), Stockholm, 1976. 242 pp., illus. Paper, 50 SKr. Ecological Bulletins, No. 24.

**Childhood Autism and Structural Therapy.** Selected Papers on Early Childhood Autism. Alan J. Ward with contributions by H. Allen Handford and Virginia M. Leith. Nelson-Hall, Chicago, 1976. xii, 224 pp. \$14.

**China's Energy.** Achievements, Problems, Prospects. Vaclav Smil. Praeger, New York, 1976. xxii, 250 pp., illus. \$18.50. Praeger Spe-

cial Studies in International Economics and Development.

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**Democracy in Deficit.** The Political Legacy of Lord Keynes. James M. Buchanan and Richard E. Wagner. Academic Press, New York, 1977. xii, 196 pp. \$11.50.

**Don't Be Afraid.** A Program for Overcoming Your Fears and Phobias. Gerald M. Rosen. Prentice-Hall, Englewood Cliffs, N.J., 1976. xii, 128 pp. Cloth, \$8.95; paper, \$3.95.

**Handbook of Operant Behavior.** Werner K. Honig and J. E. R. Staddon, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1977. xiv, 690 pp., illus. \$39.95. The Prentice-Hall Century Psychology Series.

**Handbook of Statistical Distributions.** Jagdish K. Patel, C. H. Kapadia, and D. B. Owen. Dekker, New York, 1976. xvi, 302 pp. \$19.75. Statistics, vol. 20.

**Help Your Child to Read Better.** James Schiavone. Nelson-Hall, Chicago, 1977. xiv, 122 pp., illus. \$8.95.

**Herbicides.** Physiology, Biochemistry, Ecology. L. J. Audus, Ed. Academic Press, New York, ed. 2, 1976. 2 vols., illus. Vol. 1. xxii, 608 pp. \$48. Vol. 2. xx, 564 pp. \$38.25.

**Hidden Images.** Games of Perception, Anamorphic Art, Illusion. From the Renaissance to the Present. Fred Leeman. Concept, production, and photographs by Joost Elffers and Mike Schuyt. Translated from the German edition by Ellyn Childs Allison and Margaret L. Kaplan. Abrams, New York, 1976. 166 pp. Paper, \$9.85.

**Hypertension and Stroke Control in the Community.** Proceedings of a meeting, Tokyo, Mar. 1974. S. Hatano, I. Shigematsu, and T. Strasser, Eds. World Health Organization, Geneva, 1976 (U.S. distributor, Q Corp., Albany, N.Y.). 364 pp., illus. Paper, \$12.

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**Immune RNA in Neoplasia.** Proceedings of a symposium, Woods Hole, Mass., Oct. 1975. Mary A. Fink, Ed. Academic Press, New York, 1976. xxiv, 316 pp., illus. \$15.

**Immunology for Surgeons.** J. E. Castro, Ed. University Park Press, Baltimore, 1976. x, 402 pp., illus. \$29.50.

**Improbable Planet.** William S. Vincent. Vantage, New York, 1976. xii, 244 pp. \$8.95.

**Incontinence in the Elderly.** F. L. Willington, Ed. Academic Press, New York, 1976. xiv, 266 pp., illus. \$17.

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**Intelligence.** Nature, Determinants, and Consequences. Ernest Bright Broday and Nathan Brody. Academic Press, New York, 1976. x, 242 pp., illus. \$12.50. Educational Psychology.

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