Photosynthetic Oxygen Evolution

Edited by H. Metzner
Academic Press; London, 1978
xvi + 532 pages. £18.00

The splitting of water to provide electrons and protons to subsequently reduce CO_2 to organic matter in plants (and incidentally evolve O_2 as a by-product) is the most important reaction in life – it has been in the past and will probably continue to be so in the future. But . . . we don't know how the plant does it! If we could understand the mechanism of how visible light can split water we may be able to mimick photosynthesis in the future and construct artificial solar energy systems.

However, for the present we know some of the components required by the photosystem II of chloroplasts to split water and evolve oxygen, viz. manganese, bicarbonate, chloride, a *P*-680 reaction centre, a chlorophyll *a*/*b* light harvesting complex, and the ability to accumulate or stabilize the 4 charges (from 4 photons) required for each mole of oxygen evolved. The aim of the symposium held in Tübingen in September 1977 (the progenitor of this book) was to bring together photochemists and photobiologists to discuss the state of the art as they saw it and to suggest ways of 'cracking' this most intractably difficult of all reactions in photosynthesis.

The book is a good compilation of research in most of the key laboratories (a few are regretably missing). There are also a few chapters surveying the field; these are especially useful to newcomers – and to oldtimers who often forget the fundamentals of the problem. It seems important that research workers in various disciplines collaborate in tackling this water-splitting reaction. Data has been slow in coming and the research has often been discouraging. Now it looks as if this research is attracting much more interest and there is evidence of multidisciplinary approaches. Hopefully the next such symposium will show some real advances in knowledge.

This volume is well produced and the subject index is useful. In our laboratory it has already proved its worth. Let us hope that the next symposium volume includes all the laboratories actively working on this intriguing problem.

D. O. Hall

Chloroplast Development

Developments in Plant Biology: Volume 2

Edited by G. Akoyunoglou and J. H. Argyroudi-Akoyunoglou
Elsevier/North-Holland Biomedical Press; Amsterdam, New York, 1978
xvi + 888 pages. $98.00; Dfl 220.00

This book represents the proceedings on the international symposium on Chloroplast Development that was held on the island of Spetsai, Greece, with 150 participants in July 1978.

The 108 contributions are arranged in 5 unequal sections:

I. Structure and Function of Chloroplast Membranes (2)

II. Biosynthesis of Chloroplast Components: Chloroplasts (16) Lipids and Proteins (23)
III. Development of Photochemical Activity, Growth of the Photosynthetic Unit and the Structure–Function Relationship (24)
IV. Chloroplast Genetics and Information Processing (27)
V. Control of Chloroplast Development (15)

Sections I and III are not logically separated, and their contents show the interdependence of studies on mature and developing material.

Although three disciplines are represented – the studies of photosynthetic mechanism, genetics and plant physiology – there is an even gradation between them in the papers presented. The 'structural' papers are concerned with the three or perhaps four protein chlorophyll complexes (see, e.g., Boardman and Anderson) and their assembly into the particles visible in electron microscopy (e.g., Miller; Steinback et al.) and the biosynthesis of their component chlorophyll and protein is attacked both by biochemical and applied-genetics methods. Section IV provides a timely continuation to such previous conference proceedings as, Genetics and Biogenesis of Chloroplasts and Mitochondria (1976) edited by Th. Bücher et al. (Elsevier/North-Holland, Amsterdam). The biochemical approach leads to section V in which explanations are sought on the basis of the physiological control of biosynthesis by red light (via phytochrome?), blue light (via protochlorophyllide and flavins?) and hormones (cytokinins and abscissic acid).

The relationship of cytoplasm/nucleus and the chloroplast, (e.g., Ellis and Barraclough; Feierabend) and the active and passive roles of the organelle's envelope (e.g., Douce and Joyard; Leong and Schweiger) are stressed by several workers.

The editors are to be congratulated for their organisation and prompt publication of the material. The publishers have produced an attractive volume, unavoidably in typescript, with excellent clarity in the photographic plates. There is an author index, but no list of participants and their addresses.

This is a valuable collection for workers in a wide field of biochemistry, plant science and organelle-genetics. The series, Developments in Plant Biology, includes one other title, Plant Mitochondria (1978) edited by G. Ducet and C. Lance.

R. P. F. Gregory

Plant Mitochondria

Developments in Plant Biology: Volume 1

Edited by G. Ducet and C. Lance
Elsevier/North-Holland Biomedical Press; Amsterdam, New York, 1978
xxiv + 454 pages. $60.00, Dfl 135.00

In an excellent introductory chapter one of the editors (C. Lance) outlines the 'nearly thirty years of experimental plant mitochondriology'. He considers that the birth occurred upon the publication of Millerd, Bonner, Axelrod and Bandurski's paper in 1951, showing that the oxidative enzymes of plant cytoplasmic particles are associated with mitochondria. Since then over 2000 papers have been published on isolated plant mitochondria. In fact the title of this symposium would have been more accurate as 'The Bioenergetics of Higher Plant Mitochondria' since this is where the main emphasis is centred. Lance shows that over the last decade there has been a decreasing emphasis on higher plant mitochondria (now representing about half of the published papers) towards studies on mitochondria from yeasts and fungi. The isolation techniques for obtaining good mitochondria from these latter organisms was only developed in the mid-sixties – a field the reviewer was involved in while working with *Neurospora*.

This well-produced and rapidly-published symposium volume (within 5 months of the meeting) gives