Thirty Years of Photosynthesis 1974–2004, by Grahame J. Kelly and Erwin Latzko

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BOOK REVIEW

Thirty Years of Photosynthesis 1974–2004, by Grahame J. Kelly and Erwin Latzko

Springer Verlag, Berlin and Heidelberg, Germany, 2006, 414 pp with 61 figures and 2 tables. ISBN 3-540-28382-X. US $259; ~200 Euro

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This book is a collection of the previously published 16 reviews by G.J. Kelly and E. Latzko (and by J.A.M. Holtum) that appeared approximately every 2 years in the series, *Progress in Botany* (=Fortschritte der Botanik).[1] The title of the book is misleading as it covers only the reviews by the authors in one area of photosynthesis: Carbon Metabolism. It does not contain extensive reviews by Jan Amesz on the ''Light Reactions'' of Photosynthesis, and by Manfred Kluge on ''Metabolism of Organic Acids,'' related to Carbon Metabolism. A selected list of some of the relevant papers, since 1974, on photosynthesis, not included in this book, is provided here in a footnote.[2] Notwithstanding the misleading title, the reviews provide historical snapshots of the development of our now extensive understanding of the enzymes, biochemical regulation, and organelles associated with photosynthetic carbon metabolism as it exists in C3, C4 and CAM plants and with limited coverage of algae and cyanobacteria (mostly publications dealing with the CO_2-concentrating mechanism).

The book begins with a foreword by Ulrich Lüttge (of Darmstad), followed by a Preface by G.J. Kelly, and then the reviews follow: by E. Latzko and G.J. Kelly (Progress in Botany, vol. 36, 1974; vol. 38, 1976; vol. 40, 1978; vol. 42, 1980), by G.J. Kelly and E. Latzko (Progress in Botany, vol. 44, 1982; vol. 46, 1984; vol. 54, 1992; vol. 55, 1993; vol. 57, 1995; vol. 59, 1997), by J.A.M. Holtum, G.J. Kelly, and E. Latzko (Progress in Botany, vol. 48, 1986), by G.J. Kelly, J.A.M. Holtum,

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[1] Progress in Botany (and Fortschritte der Botanik) includes reviews in Genetics, Physiology, Systematics, and Ecology (current series editors are: K. Esser, U. Lüttge, W. Bey-Schlag, and J. Murata). With a few exceptions, the series has appeared annually: During 1942–1952, only four volumes were published (vols. 12–15); there was no volume in 1965; and in 2006, two volumes (67 and 68) were published. The journal has changed its cover several times (since 1974): it was light green from vol. 36 through vol. 46; dark green from vol. 47 through vol. 58. The series listed authors' names with their formal titles, e.g., Professor Dr. E. Latzko; however, from vol. 46 (1984), they were removed from the Table of Contents, although they continued to be listed at the end of each chapter. From vol. 50 (1988), the production format was improved. From vol. 52 (1990), the year began to appear on the spine of the book, making it easy to find it, and since vol. 59 (1997), the cover became a combination of yellow and green, just as the current book is. Further, the German title ''Fortschritte der Botanik'' was removed from vol. 59 (1997) onwards.

[2] (Since the current book is for the period 1974–2004, we have not provided here any information from volumes 1 (1931)–35 (1973).) J. Amesz (1975) Photosynthesis. Biophysical Aspects. *Progress in Botany* 37: 107–120. E. Beck (1975) Carbohydrate Metabolism. *Progress in Botany* 37: 121–132. J. Amesz (1977) Photosynthesis II. Biophysical Aspects. *Progress in Botany* 39: 48–61. M. Kluge (1978) Metabolism of Organic Acids. *Progress in Botany* 40: 119–149. J. Amesz (1979) Photosynthesis. Structure and Function of the Photosynthetic Membrane. *Progress in Botany* 41: 55–70. J. Amesz (1981) Photosynthesis. The Photosynthetic Reaction Centres. *Progress in Botany* 43: 49–63. M. Kluge (1981) Metabolism of Organic Acids. *Progress in Botany* 43: 64–73. E. Beck and H. Hoff (1982) Carbohydrate Metabolism. *Progress in Botany* 44: 132–153. J. Amesz (1983) Photosynthesis. Photosystems in Green Plants and Green

and E. Latzko (Progress in Botany, vol. 51, 1989), and by G.J. Kelly (Progress in Botany, vol. 61, 1999; vol. 63, 2001; vol. 65, 2003), and the book ends with Kelly's chapter ''Photosynthesis. Carbon Metabolism: The Calvin Cycle's Golden Jubilee'' (Progress in Botany, vol. 67, 2005).

In our opinion, Calvin cycle should have been called Calvin–Benson–Bassham Cycle to recognize the tremendous contributions of Andy Benson and James A. Bassham. See historical perspectives by Benson (2002) and Bassham (2003) on the C3 pathway. Also see perspectives by Hatch (2002) for the C4 pathway, Black and Osmond (2003) for CAM, Crasulacean Acid Metabolism, Ogren (2003) for photorespiration, and Portis and Salvucci (2002) for Rubisco activase. Discoveries in most aspects of photosynthesis are covered in the time-line by Govindjee and Krogmann (2004) and in Govindjee et al. (2005).

This book is a useful addition for the training of graduate students and post-doctoral associates in research laboratories on ''Carbon Metabolism'' as it provides a historical listing of important publications dealing with the major aspects of photosynthetic carbon metabolism including: Rubisco (ribulose 1,5-bisphosphate carboxylase/oxygenase), photorespiration, other enzymes in the reductive pentose phosphate cycle, light-mediated control of enzymes, PEP (phsphoenol pyruvate) carboxylase, variations of C4, C3–C4, and CAM metabolism, starch and sucrose metabolism, mitochondrial respiration, stress and metabolism, the uptake of CO_2 by algae and cyanobacteria, and many others. Kelly and Latzko have performed a great service for the field in providing their regular reports that are brought together in this book. However, we cannot recommend it for today's beginning student because the chapters appear in their original form and no attempt was made by the authors to provide a detailed and updated commentary even as 'Note Added in the Proofs'. Thus the nearness of each individual chapter to the publications covered largely limits the authors in providing an insightful historical assessment of the significance and importance of publications that are universally renowned today. The authors' reports also include many publications, sometimes described as ''curious'' or ''surprising'', that were subsequently discredited or generally ignored. While the chapters provide comprehensive accounts of the 'recent' literature with many publications included in each chapter, most receive only a brief mention. The absence of titles in the Reference listing until the 1999 review further compounds the difficulty of discerning the basic substance of many publications.

It is indeed useful for the reader that the latter chapters of the book begin to document and signal the passing of photosynthesis research from one largely concerned with new discoveries to one concerned with exploiting all this accumulated knowledge (genetic engineering, transgenic plants, etc.) and studying photosynthetic carbon metabolism in the broader context of plant growth, development and response to the environment (via genomics, proteomics, metabolomics, etc.).

In spite of some of our concerns, we recommend this book highly to all the major libraries of the World, particularly to those that do not subscribe to the Series *Progress in Botany*.

Footnote 2 continued

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