

Book Review of Volume 25 by Christian Wilhelm

Journal of Plant Physiology, Leipzig, 2207

Chlorophylls and Bacteriochlorophylls, Biochemistry, Biophysics, Functions and Applications. Edited by B. Grimm, R. Porra, W. Rüdiger, and H. Scheer. 25th volume of the Series "Advances in Photosynthesis and Respiration" (Series Editor, Govindjee). ISBN 1-4020-4515-8

Chlorophylls convert several hundred times more photon energy into electron flow than all human power stations and engines together. Therefore, all energy stored in fossil products draws back to chlorophylls' work, and the only chance to survive the future climate change without social collapse is the hope that chlorophylls' work will continue possibly even better than before. The relevance of chlorophyll science is witnessed by the fact that four Nobel prizes have been awarded to scientists whose aim was to shine light into the chemistry and the function of chlorophylls. It is now sixteen years ago, when CRC press published the book "Chlorophylls" edited by Hugo Scheer. Due to his worldwide contacts Hugo Scheer could then motivate 72 authors to review the knowledge on structure, spectroscopy, biosynthesis and functions of all types of chlorophylls which have been evolved during more than three billion years of the phylogeny of photosynthesis. This book having approximately 1200 pages became like a bible in most photosynthesis laboratories. However, this book is out of print since 1995, and photosynthesis research and chlorophyll chemistry has tremendously extended not only with respect to knowledge but also to applications. Chlorophyll binding proteins have been crystallized and resolved with atomic resolution. Therefore, we understand now much better how chlorophylls act in antenna proteins to optimize both light harvesting and heat dissipation preventing the formation of toxic oxygen species. We can now draw a detailed picture on the distance and orientation of chlorophylls in the reaction centers of bacteria as well as of photosystem II and photosystem I. This deeper understanding of chlorophyll function has led to new applications: chlorophylls as sensitizers to fight cancer, to mimic native chlorophyll organization in artificial photosynthesis constructs, or to map from the outer space, the marine primary production which plays a crucial role in climate stabilization.

These new aspects had been taken into account and are embedded in more traditional chapters like chlorophyll metabolism or the late steps of chlorophyll biosynthesis. The book contains 9 chapters on structures, chemistry and analysis, 9 chapters on metabolism, 9 chapters on chlorophyll organization in their native environment, four chapters on functions and six chapters on new applications. All of them contain up-to-date information in a perfect mixture of basic knowledge and recent progress. Therefore, the reader does not depend on the former CRC book (although I found it helpful to keep it still on my desk). Reading the book I was really impressed how successfully the editors organised the writing of this chlorophyll community. There is no important aspect which has not been incorporated and there is only very limited redundancy in the different chapters. The extraordinary quality of the book becomes also obvious by the reference lists: It is a perfect mixture of recent work with keynote papers from the past. Nearly all chapters contain at the end a short paragraph "notes added in proof", where the authors update their conclusion in the light of other chapters and recent progress.

In conclusion, this new book again edited by Hugo Scheer together with Bernhard Grimm, Robert Porra and Wolfhard Rüdiger is again a milestone in chlorophyll science. This

new book is the 25th volume of the Series “Advances in Photosynthesis and Respiration” which is known to be the best in that field. In my view the new chlorophyll book is even in this excellent book series a real highlight and I can congratulate Govindjee as the editor in charge to have this opus as a part of this famous series. In most cases the price is a critical point. However, this book costs only 170 € for members of the International Society of Photosynthesis Research (ISPR). Coming back to the current and future relevance of photosynthesis, this book demonstrates the scientific impact of this scientific community and especially of their leading members.

Christian Wilhelm

Editor in chief, Journal of Plant Physiology, Leipzig