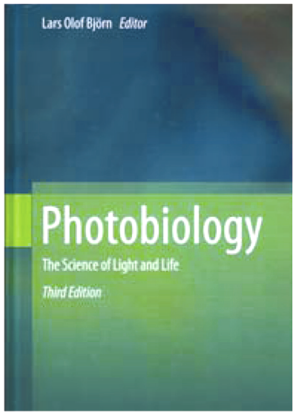

Photobiology: The Science of Light and Life. Lars Olof Björn (ed.). Springer Science + Business Media, New York. 2015. 3rd edn. 455 pp. Price: 124.94 Euros (e-copy) and 149.99 Euros (hard-copy).

The third edition of L. O. Björn's authoritative book on *Photobiology* provides an interdisciplinary treatise of almost all aspects of the extensive interaction between light and the living organisms. It starts by providing the basic physics of light and then discusses the general research methods concerning all aspects of light. It then focuses on two major aspects of the use of light by living organisms: for obtaining information as well as energy. The book includes the basics of the use of light in biological processes, not only in photosynthesis, which provides all the oxygen we need to breathe and all the food we have on Earth, and the petrol we use in our cars, but also about our vision, circadian clocks, light-promoted infections, bioluminescence and photobiology of human skin, among other topics. The book will be useful for undergraduate, graduate and postgraduate students, since it provides not only the basic physics of light, but in-depth information on the practical aspects of light measurement as well. It provides hints for teaching experiments and demonstrations, as well as information on the amateur scientist's spectrophotometer. It is not only an authoritative book, but is fun to read and use. As the editor remarked in the Preface, this book is intended as a starting point, not as a final word.

The above and much more is covered in 29 authoritative chapters, with most of them (22 of them to be precise) authored or co-authored by the editor himself, who is one of the best known educationists for photobiology. In addition to the editor, there are 20 other authors chosen from around the world for their expertise in different areas of this field, giving the book an international character and appeal. The eleven-page index is extremely helpful in finding the varied topics dealt with in this book.

The book covers a well-balanced cross-section of different aspects of photobiology. Chapters 1 through 9 cover theoretical and practical aspects of the nature of light, its generation, quantification and measurement, light as a tool for biologists and different types of light, including the latest developments in using it as a tool, e.g. optical tweezers. Chapters 8–10 are devoted to action spectroscopy and spectral tuning in biology. The topic of spectral tuning has been divided into two parts: chapter 9 covers pigments, and chapter 10 deals with structural colour. Chapters 11 and 12 give a detailed account of photoactive proteins, molecules and photochemical reactions in biological light perception and regulation. Chapter 13 discusses the evolution of photoreceptive proteins. Chapter 14 deals with signalling crosstalk under the control of plant photoreceptors; the latter is a complex topic that is dealt with quite effectively. Chapter 15 is a departure from the plant theme and describes the diversity of eye optics. Chapters 16 and 17 cover the important topic of evolution of photosynthesis, its impact on the environment and photosynthetic light harvesting. Departing again from photosynthesis, chapter 18 discusses in great detail how light affects the circadian clock. Photomorphogenesis and photoperiodism in plants are discussed in chapter 19, while chapter 20 provides a short description of how insects, amphibians and birds detect directional information from the Earth's magnetic field in a light-dependent mechanism. Chapter 21 is on phototoxicity, whereas chapter 22 is devoted to the important topic of ozone depletion and the effects of ultraviolet radiation. Chapter 23 (Vitamin D: photobiological and ecological aspects) covers an important topic for us all, and discusses not only the effects of the vitamin on bone health, but also non-skeletal effects in providing potential protection against a variety of human diseases. The photobiology of human skin – another topic pertinent to human health is discussed in chapter 24. Many infection-causing organisms are coloured and their pigments are necessary for virulence, a fact often ignored and not much worked upon. This topic is covered in a short but interesting chapter 25. The next topic is bioluminescence; authors not only discuss its biological function, but its control mechanism, as well as its exploitation by humans. How life originated is a question that has occupied human endeavour for centuries and with the discovery of organic compounds in extraterrestrial space, there is no time like the present to make leaps in understanding this important question. This topic is discussed briefly in chapter 27 (Role of ultraviolet radiation in the origin of life).

The last two chapters of the book, as in the previous editions, are devoted to practical aspects. Chapter 28 (Hints for teaching experiments and demonstrations) will undoubtedly remain a popular resource for anyone designing a laboratory course in photobiology. Chapter 29 (The amateur scientist's spectrophotometer) had been a popular topic of the book in the earlier editions, and Björn must be thanked for this useful project for budding photobiologists.

This book is not only enjoyable to read, but will benefit a majority of students and researchers alike, who have interest in using the all-abundant solar energy for the benefit of the human race – through biology. It is a must read not only for students of biology, chemistry and physics, but also for those who are working in what we call today 'biotechnology'. I recommend this book not only to all libraries in biology, biochemistry and biophysics, but also to those in biotechnology, agricultural, chemical as well as biological engineering.

I end this book review by quoting, for fun, what Björn himself wrote in 2002:

'But in the greenery above my face,
an even greater miracle is taking place:
Leaves catch photons from the sun
And molecules from air around.
Quanta and carbon atoms become bound.
Life, for them, has just begun.'

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