

## **Green Universe: a Microscopic Voyage into the Plant Cell.**

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## PLANT PORN

**Green Universe: A Microscopic Voyage into the Plant Cell.** Stephen Blackmore. Papadakis Publisher, 2012. 256 pp., illus. \$60.00 (ISBN 9781906506216 cloth).

**G**reen Universe: A Microscopic Voyage into the Plant Cell presents a panoramic overview of the morphology and anatomy of the plant kingdom, from algae to angiosperms. The format is large (the volume measures 25 × 25 square centimeters), the pages are black and shiny, and the photographs are splashy. Some photos span an entire spread; others take up a full page. Flipping through the pages of this book, anyone with a coffee table will be intrigued and impressed by the intricacy and splendor of plants.

Author Stephen Blackmore, regius keeper of the Royal Botanic Garden

Edinburgh, is an accomplished botanist and palynologist who has published both scientific monographs and generalist books. The latter range from field guides to a manual for sustainable gardening. For *Green Universe*, he took many of the photographs himself. The book's images are mainly of three kinds: macroscopic images of whole plants or organs, micrographs of cells or tissues taken with a scanning electron microscope, and light micrographs of prepared slides. Each image has a cursory caption identifying the species and stating a salient fact.



As the book's subtitle suggests, micrographs (both light and electron) are its cynosure. Of them, the scanning electron micrographs are original and uniformly stunning. As a researcher, Blackmore was an early adopter of the scanning electron microscope in biology and has used it incisively. Arguably, these micrographs are worth the cost of the book. The nonmicroscopic photographs, although they are typically of more familiar subjects (e.g., leaves or flowers), provide context and have been taken with sensitivity and grace. However, the light micrographs, although they display the layout of cell walls within an organ strikingly, often show a shriveled cytoplasm, denoting poor preparation. Furthermore, Blackmore includes few—if any—fluorescence or Nomarski micrographs. This is a pity insofar as both techniques reveal cellular structures at high contrast, including in living material. Except perhaps for their size, the images of mitosis might have been published by E. B. Wilson a century ago.

Oddly, for what is ostensibly a photographic voyage, *Green Universe* contains a great abundance of text. Whereas some spreads are occupied entirely by a photograph, most of them have a

photograph on one page and a swath of text on the other, and quite a few spreads have text on both pages, with photographs relegated to the margins.

The text is not only long, but it is difficult to read: set in a repellant sans-serif font at a size that verges on the microscopic and usually printed in a pastel color on a black background. Accessibility is further diminished by the chapters' comprising dozens of pages while being devoid of headings. Compounding the unfriendliness of the typography is an apparent carelessness of editing. A more careful editor might have found some of the book's mistakes. To pick out a few, the word *flagellae* is a solecism, malate is not a product of decarboxylation in  $C_4$  photosynthesis, and the formula given for resolution in the light microscope is wrong. More important, a more careful editor would have helped to channel the text, whose page-long paragraphs tend to wander through topics like a child exploring the seashore.

For all this abundance of text, who is the target audience? *Green Universe* could be written for nonscientists, a suggestion supported by introductory treatments of concepts in biology, such as DNA and mitosis, that are given essentially from first principles. But I worry about such a reader. A painstaking account of DNA comes after a description of synthetic biology. Is it reasonable to expect nonscientists to cope with designer genomes before learning the facts of DNA? Moreover, I estimate the length of the text to be 50,000 words—a substantial number for a book whose large size and glossy pages make even the act of reading a challenge. In fact, the text is a reasonably complete primer on botany, treating the cellular and reproductive structures of many groups of plants in considerable detail, but it presents this complexity with neither diagram nor direct reference to any of the marvelous photographs. Without reference to a diagram, it strains credulity that a nonscientist could follow, for example, the peculiarities of gnetalian sex.

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Perhaps the intended readers are, after all, botanists. I confess to having been delighted to learn that *Welwitschia* is the eponym of a nineteenth-century botanist, and I am grateful to be reminded of *Isoetes* and other wonders of cryptogamic botany that I once studied and had long forgotten. But, alas, for a botanist, the text is too much textbook. Most of the treatment is standard, if not cliché, as the author guides us, branch by branch, to the crowning glory of flowers. I am tired of hearing early-diverged organisms called “primitive.” Maybe their longevity testifies to their perfection. Maybe lineages that branch and branch again are the backward ones, continually getting it wrong and needing a do-over? If the book were written for experts, here and there, the author should have smacked me with an idea.

A reader may ask, “With all those striking photographs, why does this reviewer natter on about the text? Botanist and nonbotanist alike will enjoy the images.” This is true, but also, sadly, a little mindless—rather like the swimsuit issue of a sports magazine, where the quality of articles on the mechanical properties of spandex is beside the point. The photographs in *Green Universe* could have been more than pretty; they could have been revelatory. Instead of offering a disconnected botanical trudge, the text could have concisely annotated and explained the images, perhaps with the occasional companion diagram. Conceivably, Blakemore feels that the images should speak for themselves. Fine—let them: Replace the thick text with short passages, just a few pages in length, interspersed among major groupings of images.

In summary, *Green Universe* comprises two fine books, forced to marry. One is a textbook on botany, an authoritative account of the major groups of plants, written from an evolutionary perspective. The other is an album of remarkable images. Each book on its own could be splendid; joined, they throw pots at each other. A chance was missed here to introduce readers to the plant panoply. The need

for such an introduction is pressing as humans abandon strolling in the woods in favor of scrolling down Web pages. The photographs in this book do invite the reader to admire the plant kingdom. However, we need to learn something about those cells with their bright colors and intricate shapes; otherwise, we can only ogle.

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