fundamental aspects of plant biology. 'Plants and People' essays provide interesting insights on the numerous interactions and links between humans and the botanical world. These boxes present useful vignettes that should help students better understand and appreciate the importance of plants ecologically, culturally, scientifically and economically.

The content of the book is thorough and presents an accurate overview of modern understanding about and perspectives on plants; however, this thorough coverage of individual topics is one of the drawbacks of the book. At times, the writing can be dense and may potentially be difficult for some students to follow. This aspect of the book perhaps makes it a better choice for an advanced level or possibly an honours course in botany rather than for a general introductory botany course with mixed majors and non-majors. Another difficulty is that although the book contains numerous useful illustrations and graphics, there are some in which it is difficult to differentiate structures due to the similarity of colours in the diagrams. These palette problems may make it especially difficult for students to distinguish among important points in projected images. Perhaps these less-distinct illustrations are from previous editions while more brightly coloured figures are new additions. The book covers all of the essential topics, but it does seem that the ecology section is somewhat lacking. It contains only two chapters: one chapter is a standard coverage of biomes and the other is a combination of populations and ecosystems. Coverage of plant community ecology is noticeably missing. Likewise, it seems odd that there are no chapters that specifically address topics of plant biotechnology, plant conservation, biofuels or agriculture. Given the importance of these topics and the wealth of information that exists about them, it is unfortunate that their only coverage comes in the boxed essays mentioned above. Hopefully future editions will expand coverage to include these topics.

In summary, there are some minor issues with this book. However, Mauseth's *Botany* is overall a very good book and provides a worthy title for instructors of introductory botany courses to consider. While it can clearly serve as the primary text for a general botany course, it could also potentially be used as a supporting text for other courses as well.

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Plant structure. A colour guide, 2nd edn

Bowes BG, Mauseth JD. 2008.
London: Manson Publishing.
£29.95 (paperback). 288 pp.

I regularly – and (I hope) rightly – bemoan the lack of plant anatomical knowledge of modern-day biology graduates, so it's always good to see books that try to remedy that deficiency! Expectations were accordingly high when I received *Plant*

structure by Bowes and Mauseth (hereafter referred to as *B&M2e*) to review.

Although *B&M2e* is fairly conservative in terms of content of its eight chapters, this is largely inevitable; there is a standard set of topics that are fundamental to plant anatomy that all books that aspire to deliver on the subject ought to contain. Each chapter begins with a short introductory text that summarizes the main features of the chapter's subject. And this is done with admirable succinctness. Briefly, the contents are: Chapter 1, Introduction, which sets the theme for the atlas and covers such topics as the variety of land plants, transpiration and translocation in vascular plants, general morphology of angiosperms (the book is largely concerned with flowering plant anatomy), floral and reproductive features. Chapter 2, The Plant Cell, is an introduction to plant cell ultrastructure. Chapter 3, Plant Histology, considers cells and tissues of the primary and secondary plant body (this and all subsequent chapters contain images almost solely at the light-microscope, LM, level, the primary level of inquiry of the book). After Chapter 4, Apical Meristems, there follow chapters dedicated to the major organs of the vegetative plant body: 5, The Green Leaf; 6, The Stem; and 7, The Root. The anatomical survey is concluded with Chapter 8 on Plant Reproduction. A selected bibliography, glossary and index complete the book.

Perhaps the most telling comparison of *B&M2e* is with the book's 2004 first edition (*1e*), which was sole-authored by Bowes. Many of the figures in *B&M2e* are the same as those in the *1e* (and why not? They are generally very good images, but do actually look even better in *B&M2e*!). However, there are nearly 200 more images in *B&M2e*, which is the main reason why it has almost 100 more pages than *1e*. Both editions have eight chapters and, except for Chapter 8, the same titles; Chapter 8 is termed Plant Reproduction in *B&M2e* – rather than Sexual Reproduction – because it has been expanded to include asexual propagation methods. Whilst the text in both editions is largely the same, it has been considerably supplemented in many places in *B&M2e*, e.g. approx. 2.5 pages on leaf modifications in Chapter 6 (although this may not sound much, since the text of a chapter in *B&M2e* is only approx. 6.25 pages this represents a substantial increase). And there are also new sections dealing with mangroves, succulent roots, parasitic plants and ant-plants in Chapter 7. As one might expect from Mauseth's involvement, there are a lot of cactus images in *B&M2e* (and yes! anatomy of cactus spines is one of the new items on leaf modification in Chapter 5). The bibliography, glossary and index are also all larger in *B&M2e*.

Inevitably in such a volume, attention focuses on the images. And here is where I have a big problem with *B&M2e*. Notwithstanding how stunning and beautiful the images are (which they are and for which full credit is rightly and richly deserved), they suffer from a massive fundamental flaw: nowhere are scale bars provided for any image, nor even an indication of the magnification (which latter basic information was provided in *1e*). Why is this essential information not provided? Not only is its omission baffling and bizarre, it seriously undermines any value the text has as an aid to teaching plant anatomy!

B&M2e compares well with other recent LM-based plant anatomical texts, such as Peterson *et al.* (2008) and Cutler *et al.* (2008; although both of these have accompanying CDs with digital versions of the book's images – which

addition would have made *B&M2e* even more valuable and up-to-date). But *B&M2e* is arguably better than plant anatomy texts such as Rudall (2007) and Evert (2006) since it has abundant colour images, which in my view are essential for a proper appreciation of such a visual subject as plant anatomy (as underlined in the sub-title of *B&M2e*). Of relevance here is also Perry and Morton's (1998) photo atlas; although their images may not be as impressive as *B&M2e*'s, they do at least give details of the magnification.

Without doubt Bowes & Mauseth's *Plant structure* is a stunning collection of anatomical images at the light-microscope level with informative accompanying text. And at approx. £0.05 per image it represents excellent value. It is therefore such a shame that its educational worth is considerably devalued by images devoid of any indication of magnification or scale.

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Plant cell biology on DVD.

Gunning BES. 2009.

Berlin: Springer. £53.99 (DVD).

For readers of a certain age their initiation into the art of botanical electron microscopy was probably aided by Gunning and Steer's (1975) collection of TEM images. I well remember the hours I spent poring over its beautiful illustrations, which acted as sirens tempting me into the hidden world of plant cell ultrastructure. Now

those days can not only be revisited in a suitably modern electronic way with Brian Gunning's *Plant cell biology on DVD* (hereafter referred to as *PCB*), but a new generation can be inspired by the joys of cells.

PCB certainly delivers what it promises – the whole of plant cell biology on one DVD. But, although there will be few surprises with its contents – e.g. survey of cell types, plastids, ER, Golgi, cytoskeleton, mitochondria (plant cell contents are, after all, reasonably well catalogued) – this DVD is much more than just a digital version of Gunning and Steer's (1975) black-and-white image collection (although

PCB boasts approx. 2000 of those!). One of the great strengths of *PCB* is its wealth of >240 moving images that bring alive the dynamic nature of plant cells in a way that no static image can. Another strength is the impressive number of colourful fluorescence studies, which really impress upon the viewer the truly wonderful world of plant cell structure and ultrastructure that is still to be fully explored. In browsing *PCB* you run out of superlatives to describe the wonders within; whilst many of the images will be familiar to users of Gunning & Steer's hard copy publication, many more are new and often provided by some of the world's leading exponents of plant cell biology. The large number in colour serves to dramatically update Gunning & Steer's largely conventional TEM images of 1975 with the intervening >30 years of developments in molecular biology, particularly its use of fluorescent reporter genes. Although *PCB* is firmly rooted in the TEM world, almost all of the movie sequences are at the LM level, which latter serve both to bridge the structural and ultrastructural levels and dramatically demonstrate structure-and-function aspects of plant cell biology.

Probably unusual for a cerebral, academic publication, *PCB* truly is a labour of love. However, lest we be too readily seduced by the beauty of the images into accepting that seeing is believing, *PCB* provides an excellent opportunity to present information on the techniques used to generate the images, particularly comparing various TEM preparation procedures. Although this has been done to some extent in the Golgi 'chapter' where CTEM, freeze-etching, HP freezing and tomography are 'compared', I feel a separate section devoted to this could have been very instructive (perhaps something for a future revised edition?). A most useful feature that is present is the 11-image sequence of the same cell showing different degrees of information revealed by different optical/staining techniques in LM.

Computer skills are needed to use the DVD, but not of a very high order; most people should be able to make use of *PCB* with little trouble. Consequently, whilst a period of practice with the disk and its various functions is advisable to get the fullest benefit, it can be used immediately with just the basic screen copy function. Although the built-in facility to make your own customized recordings of selected images is useful, I suspect many users – like me – will simply want to liberate the beautiful images and use their own favourite presentation programs for teaching purposes.

Competition for *PCB*? I'm not aware of anything that comes close! Although Donaldson and Bond's (2005) DVD is a super collection of images and techniques, it concentrates specifically on the fluorescence microscopy of wood anatomy and can't compete with the sheer range of *PCB*.

The publisher tell us that *PCB* has been written (strange emphasis for such a visual feast) for a wide audience, including lecturers, researchers and students in plant cell biology, but also with school-teachers in mind. This latter group can be very influential in opening the eyes of the young to the wonders of plants, and if showing off *PCB*'s movies to that audience can help to dispel the myth that plants 'don't do anything' that would be great. And if that inspires a new generation to become botanists, that would be an added bonus!

So, *Plant cell biology on DVD*, what's not to like? Professor Gunning is to be congratulated on making this amazing collection of images – and movies – available to a wide audience. And at approx. £0.025 per image/movie,