

## BOOK REVIEWS

*Seeds: Time Capsules of Life*, Rob Kessler and Wolfgang Stuppy. 0 + 000 pp. Papadakis Publishers, London, UK. 2006. ISBN 1901092666 £35. www.papadakis.net

This book is an ambitious collaboration between Wolfgang Stuppy, seed morphologist at the Millennium Seed Bank at Kew, and Rob Kessler, artist and professor at the Central Saint Martins College of Art and Design. At its core, and surely the main reason most people would be tempted to buy the book, is a remarkable collection of scanning electron micrographs (SEMs) of seeds. Nearly all are not only spectacularly beautiful, but also intriguing. The papery lamellae of *Delphinium peregrinum* seeds (which look just like a miniature wasps' nest) surely play some role in dispersal, but how exactly? It's also clear that you couldn't appreciate how perfectly adapted to wind dispersal are the seeds of *Cistanche tubulosa* until you see their honeycomb seed coats. Even if you've spent your whole career working with seeds, as I have, I guarantee that you'll be amazed and captivated by some of these images.

On a purely artistic level, the collaboration between artist and scientist is a resounding success, but I wonder what the uninformed reader would make of the startling blue, pink, purple, orange and green shades that Kessler has chosen to colour the (originally black and white) SEMs. It's only when we get to the explanatory notes at the end of the book that we learn that the images were coloured for purely artistic reasons. They certainly look dramatic, displayed against a black background, but it makes you realise that artistic impression was the primary consideration here. Choices of seeds were also largely on aesthetic grounds, although Stuppy has done an excellent job of weaving them together into a nice account of the evolution of plant reproduction, followed by a comprehensive account of the classification of seeds and fruits and their pivotal role in plant dispersal.

But there are places where I would have preferred a more organic link between text and images. Stuppy describes the remarkable hygroscopic awns of *Erodium* and many grasses, and their role in dispersal and burial, but none of the seeds mentioned is illustrated. Similarly, the wonderful description of the

smell and taste of the durian fruit is almost enough to make you buy a plane ticket to Borneo, but wouldn't it have been great to have a picture of the fruit itself? In one or two other places, there are more serious dislocations between text and pictures. A perfectly good description of the role of elaiosomes in ant-dispersal is accompanied by two pictures of *Messor*, the harvester ant. But *Messor* is a seed predator, quite uninterested in elaiosomes, and disperses seeds only by accident (much as squirrels and jays disperse acorns).

Production values are impressive, with the whole book printed on heavy, glossy paper. But a word of warning – the glossy black backgrounds of the SEMs are easily marked by even the cleanest of fingers, so the book is best handled with kid gloves. If you buy a copy from a bookshop, make sure you get one from the bottom of the pile, away from sticky fingers. Kessler's text is not the most felicitous, but Stuppy writes engagingly, and fortunately most of the text is his. Typos are very few, but *Callitriche* is water-starword, *Cyclamen* is twice referred to as snowbread, and *Wahlenbergia* has found its way into the *Gentianaceae*. And if you ever come across the neologism haphazardous, remember you heard it here first.

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*Seed to Seed. The Secret Life of Plants*, Nicholas Harberd. 311 pp. (with illustrations by Polly Napper). Bloomsbury Publishing, London, UK. 2006. ISBN 0-7475-7039-6 £16.99 (hardback), (paperback available in early 2007)

The author of this book, Nicholas Harberd, has played a key role in the discovery of the DELLA proteins – macromolecules that are central in plant growth regulatory processes, including many aspects of seed

biology. The story of these proteins forms a major thread in the book, woven together with the life of a single *Arabidopsis* plant in an east English churchyard, coloured with musings about plants, the natural world and the intellectual processes involved in scientific research.

The book is written as a diary, with a chapter for each month. Starting in January, Harberd describes some of his early experiences in plant genetic research and his return from California to work in the John Innes Institute in Norwich, England. But the story really starts in February, with the realization – one that has an almost explosive intellectual impact – that although he had spent many years of his research life with the thale cress (*Arabidopsis thaliana*), he had never related to it as a plant in nature – a plant passing through its life cycle, enduring the rigours and stresses imposed by its environment – rather than simply as a laboratory object. And so his search begins for a thale cress to adopt, ‘to chart the life of a chosen plant, through spring, summer and autumn. To observe that precarious passage, the stages of a life cycle, an eventual death’. Travelling by bicycle through the Norfolk countryside, he eventually finds the object of his quest, by a churchyard grave: this is the plant that accompanies him throughout the remainder of the year and of the book. It is his companion in the tale of how plants, and scientists who investigate them, work. ‘And so to the plant. Not perhaps so imposing certainly, not as massive as the chestnut trees. But still significant in terms of what it represents. Itself, the trees, all plants’. As he visits the plant from time to time during the year, its life cycle is marked – stem extension, cell division and growth, leaf formation, primordia, meristems, roots and flowering. And each becomes the subject for discussion, each a little lesson on plants, their cells, their genes, their proteins; and each helping in the transmission of a sense of wonder at the processes of plant life.

And we are led into Harberd’s own research, starting with the *ga1* mutant of *Arabidopsis*, going on to the eventual isolation of the *GA1* gene, the subsequent identification of DELLA proteins and what these proteins mean for plant growth processes. Here, he tells of the doubts, anxieties and uncertainties of the researcher – what should the next experiment be? How will the research paper be received? What should be the content of the grant application?

In the author’s digressions from the main path of DELLA, Harberd reveals much of the mind and thought processes of the committed plant biologist and researcher. It is not enough, for example, simply to recount his single, youthful incursion into cannabis smoking, for the encounter should also evoke something of the science involved – that the cannabis plant

contains a gene for the enzyme promoting synthesis of  $\Delta^9$ -tetrahydrocannabinol (THC); that the THC absorbed in the lung moves in the blood to the brain, interacts there with a protein to change its shape, and thereby alters the smoker’s state of mind. And even the humble cup of tea provokes musings on plant biology – ‘And now I’ve drunk and sat for a while, looking at leaves clinging via a meniscus of dark tea to the bottom of the mug. I can see the veins and conduits that once carried water, salts and energy, that fed the cells’.

The end of his adopted thale cress’s season is reached, and in September the cycle starts again with the germination of the seeds that it has produced. ‘They are totally delightful, exquisite jewels shining through the lens. Green cotyledons. Vivid with a slight tinge of mustard. Bright against the black wet soil... The next generation. The cycle turning.’ Not quite the way the seed scientist writes his papers: and perhaps in some ways that may be regretted.

But this book is not really written for plant scientists, so the requirement for a cold, objective presentation can be overlooked. While lucidly communicating information, Harberd also succeeds in transmitting his passion for plant biology and evocatively shows us the intellectual processes of the scientist – the curiosity, the making of connections, and the ‘shock of recognition’ shared by the scientist and poet alike; and the excitement of research.

The seed scientist will do well to read this book for the scientific story it tells and for the style in which it is told. As a kind of diary, in parts it is written in the stilted, abbreviated manner of that genre. From time to time I found this a little irritating, and perhaps a mite self-conscious, but the overwhelming merits of the book far outweigh these complaints. The non-native English speaker might, however, find difficulty in coping with the writing style, for it seems to go against everything that he or she has been taught about English sentence structure. But never mind. Stick with it and you’ll soon get used to it.

Has Harberd done for modern plant science what Watson did for DNA, Dawkins and Gould for genes and evolution, and Feynman for physics? I think he has. Read it and see for yourself. You will also enjoy it.

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