

interpretations of these sequences with the reader, and these descriptions are presented primarily as demonstrations of the co-regulated nature of ape interactions. Although the cover describes the book as “eye opening”, I personally found these long and detailed descriptions of ape interactions made excellent bedtime reading.

In conclusion, like most clarion calls to scientific revolution, this book both oversimplifies the opposing viewpoint and overstates the significance and novelty of its own stance. King is correct that information theory should be extended to incorporate context and meaning, but this point was noted by the theory’s founders and is widely recognized today. The reader seeking an alternative in ‘dynamic systems theory’, as presented in this book, will find little more than a promissory note, and would probably be better served by spending a day at the zoo watching ape social behaviour themselves. ■

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## Back to the roots

### Ethnoflora of the Soqatra Archipelago

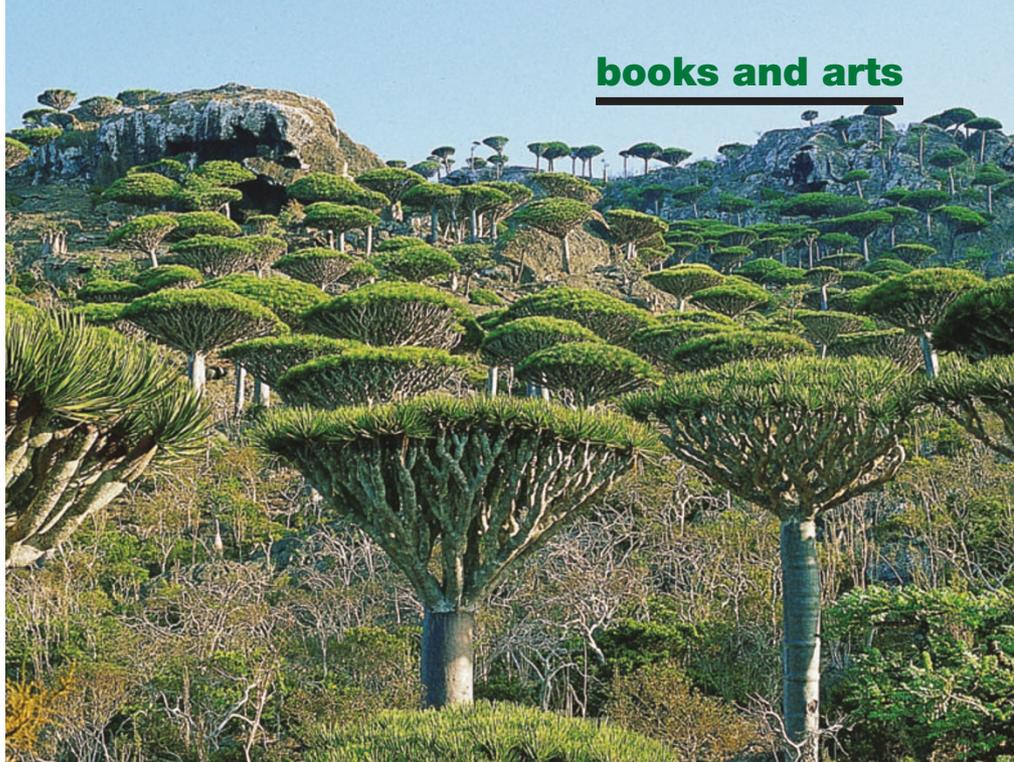
by Anthony G. Miller & Miranda Morris  
Royal Botanic Garden Edinburgh: 2004.  
759 pp. £75

Jan Salick

Stunning and sumptuous in design, *Ethnoflora of the Soqatra Archipelago* sets a contemporary standard for describing the plant life of an area and its uses. And what better focus than the exotic, unique and rich flora of the Soqatra Archipelago, south of the Arabian peninsula, off the eastern horn of Africa? An ethnoflora, although described in the book simply as the product of botanists working closely in the field with ethnographers and linguists, surpasses this process by matching diverse disciplines, objectives and issues. It combines traditional and scientific knowledge; botanical and ethnographic–linguistic description; conservation and sustainable management; and geography, plants and people.

Of the people, and for the people, of Soqatra, this work is accomplished here by an eminently qualified team from the Royal Botanic Garden Edinburgh. Anthony G. Miller is the foremost botanist of the Arabian peninsula; Miranda Morris is a linguist and ethnographer of the southern Arabian peninsula; Diccon Alexander is an illustrator, designer and photographer; and Ruth Atkinson is an ecologist, taxonomist and editor of this volume.

This ethnoflora differs from traditional



Local knowledge: ‘dragon’s blood’, the resin from *Dracaena cinnabari* trees, is used to fight infections.

floras in several ways. Comprehensive ethnographic information is presented for all species used by the islanders and their livestock. The fully illustrated key, figures and photographs illustrate all of the species and many of their characters — even the most basic, such as leaf position. Conventional taxonomic descriptions are brief and include minimal botanical terminology. These characteristics make the book meaningful and useful to a wider audience than professional botanists, including local people (if they can read English). For the benefit of conservationists and sustainable developers, all of the endemic species in the book are rated using the World Conservation Union’s threat categories.

Soqatra is home to an ancient, useful flora and 50,000 traditional people who have sustainably managed their unique centre of biodiversity and their environment for millennia. So at a deeper level, this emphasis on traditional sustainable use and management is a theme that fundamentally distinguishes this work from other floras.

The Soqotran flora cannot be discussed without mentioning the astounding plants and the landscape in which they thrive. ‘Dragon’s blood’ resin, for example, is collected from the plant *Dracaena cinnabari* and is used to fight infection and inflammation. Bitter aloes — the juice of *Aloe perryi* — has many important pharmaceutical and medicinal uses. The latex of the Soqotran desert rose (*Adenium obesum sokotranum*) is often applied to wounds. And how weird is the cucumber tree, *Dendrosicyos socotrana*? On Soqatra, these bizarre plants exist in an almost surreal environment. The endemic flora of Soqatra — one-third of its entire flora — either split from Gondwana when the ancient southern supercontinent fragmented,

or migrated to the islands from neighbouring continents and radiated to form a unique and fantastic flora.

This weighty book cannot be reviewed without extolling its stunning beauty. There is a plethora of coloured photographs, original line drawings, illustrated keys, maps, images and historic drawings. The pages are handsomely designed and never crowded. The text is easy on the eye (although the location maps are somewhat faint) and the book’s organization is readily apparent and consistent.

It is difficult to find weaknesses with this exceptional book. However, my taxonomic colleagues are always up to the challenge: they have pointed out some problems with the one big key they tried (group G) and question the accuracy of some sketches in the keys. They also challenge some of the details about certain families: for example, recent molecular studies show that *Sisymbrium* includes 45 species, not 90. Of more concern to me, as an ethnobotanist attempting to turn a historically descriptive field into a modern science, is the predominance of description and lack of analysis in the book.

In a US National Science Foundation workshop, ‘Intellectual Imperatives in Ethnobiology’, held in the Missouri Botanical Garden in 2002, we emphasized the need “to explore modern methodology appropriate for studying people–biota–environment interactions; to quantitatively analyze our multidisciplinary data based on hypotheses; [and] to develop interdisciplinary education programs to train students and practitioners of ethnobiology.” In *Ethnoflora of the Soqatra Peninsular* there is little evidence of modern methods, analyses or even education extended to Soqotrans. Additionally, many ethical issues — intellectual–property rights,

a recognition of intellectual contribution, equitable distribution of benefits, capacity building and so forth — are not generally considered in this book.

This ethnoflora is set in the purely descriptive and colonial ethnobotanical traditions dating back to Linnaeus and before. Nonetheless, it is most useful for documentation, conservation and development, even if it does not advance the modern science of ethnobotany or reconcile inequities between scientific and traditional knowledge. ■

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## Reforming research

### Scrutinising Science: The Changing UK Government of Science

by Rebecca Boden, Deborah Cox, Maria Nedeva & Katherine Barker

Palgrave: 2004. 218 pp. £45

Brian Heap

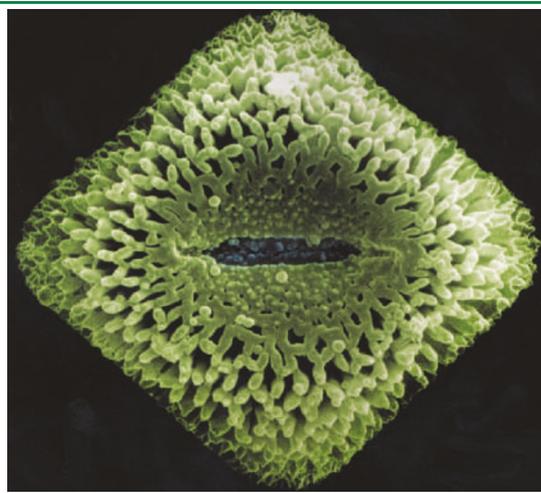
The dramatic changes in UK government research establishments (GREs) during the past 20 years constitute one of the most radical experiments in the organization and management of scientific research. And while these changes have been going on, mad-cow disease, foot-and-mouth disease and anthrax have thrust these labs into the public view. At other times, however, their work is less conspicuous but nonetheless highly significant for the public good.

During the 1980s and 1990s, successive Conservative governments seized the opportunity to address the perceived shortcomings of GRE laboratories. The experiment is outlined in the book *Scrutinising Science*, where it is seen through the lens of social and political science. The authors' analysis is based on interactions with policy-makers, senior managers and administrators tasked with carrying out their paymasters' orders, rather than on the firsthand experience of bench scientists. Some scientists found that the trauma of uncertainty and indecision resulted in planning blight and a loss of morale that was not readily reversed.

The authors helpfully trace the historical origins of the reform of GREs to theories that viewed science as a social institution: governments and politicians were supposed to fund science generously but should not intervene in the affairs of science, nor expect any tangible returns. The research councils that were formed early in the twentieth century existed on the principle of 'research council autonomy' espoused by R. B. Haldane, and other research establishments were created to serve their government departments or ministries directly. In the second half of the twentieth century,

### Secret sex

Invisible to the naked eye, pollen grains are tough enough to have survived for millennia and display a wide diversity of forms, fascinating artists and scientists alike. In *Pollen: The Hidden Sexuality of Flowers* (Papadakis, £35), botanist Madeline Harley and artist Rob Kesseler bring pollen into closer view. The informative text is accompanied by stunning original micrographs of pollen grains, and photographs of the flowers that shed them. The book also includes engravings by previous observers of pollen, including Franz Bauer and Ernst Haeckel.



new models of governance and ownership structures appeared, or were imposed upon GREs. These models ensured closer control by departments through measures such as contractor–customer arrangements — part and parcel of making science and technology 'useful' to the departmental customer.

Later, an emerging 'new public management' (NPM) ideology pervaded government policies, driven by the practice of management by accounting. The NPM reform was driven with "breathless urgency" by politicians such as Michael Heseltine, with an outcome typified by complexity and heterogeneity. Eighteen science and technology establishments were transformed into 'next step agencies' between 1989 and 1996, with funding allocated by the contractor–customer mechanisms; 15 establishments were translated into 'executive agencies' by 1992. The process was suspended in 1997 by the incoming Labour government. The authors conclude that the application of NPM reform to GREs was complicated, messy and driven by opportunism, because GREs were a relatively minor part of government.

What of the present? This complicated picture is addressed by a brief description of individual GREs and their current status. There is also a discussion of eight laboratories that have undergone this transformational organization, including the National Engineering Laboratory, the Laboratory of the Government Chemist, the National Physical Laboratory, the Met Office and the Defence Evaluation and Research Agency. The authors acknowledge that resistance to reform proved problematic in some sectors (the old Ministry of Agriculture, Fisheries and Food "proved itself remarkably adept at avoiding the privatisation issue"), but they discover a sense of relief in some laboratories that found themselves free of the restrictive practices of the past.

The authors are much less sanguine, however, about the long-term impact of reform, in terms of the quality of science, the way that technologies are provided to government,

and in particular the transparency of reporting mechanisms and accountability to departments. Accountability to departments is now done in private, based on unpublished contracts — hardly a mechanism to instil confidence in laboratories whose functions are supposed to be transparent and carried out in the national interest.

Turning to the future, the authors express concerns resulting from the earlier policies of an "energetically reforming government" that "decided it could change things — everything in fact, including science". The dissolution of GREs that had evolved over a long period of time in response to the government's need for science and technology, the creation of organizations more by accident than design, and the cost to the Exchequer of reforming GREs that were deemed eminently non-marketable — these are topics that the jury will debate for some time.

It would have been informative to evaluate in greater depth the parallel impact of NPM reform on research-council institutions, and the spillover effect in universities, too often portrayed here as remaining, in the words of economist Robert Merton, "a public-good activity compared to a commercial one". However, this is an important and well researched book, and we should be grateful that it has been written, not least because any government bent on further reform, if it is to bring about beneficial change, would benefit from reading this recent history of the governance of science. ■

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### Erratum

The Surinam toad that appeared alongside the recent review by David Lodge of George W. Cox's book *Alien Species and Evolution* (*Nature* **432**, 276–277; 2004) was of the wrong species. The pictured toad (*Pipa pipa*) resides happily in South America and is not the pest (*Bufo marinus*) that has been introduced into Australia. *Nature* apologises for this mistake.