

'what you should know about propaganda'.

Collins and Pinch are relativist sociologists who now seem to be widely regarded as among the most radical critics of natural science and scientific expertise, or at least have been denounced as such in the context of the 'science wars'. At first sight, this book confirms the diagnosis: it is 'biased' towards unedifying controversy and technical failure; it includes lengthy discussions of major disasters, such as Chernobyl and the explosion of the US space shuttle; it presents cases in which lay knowledge proves superior to that of experts. But once attention shifts to how the discussion actually proceeds, a very different story suggests itself.

To read these studies is to read what in the last analysis is a powerful defence of experts and expertise. Indeed, I know of no book more sympathetic to them outside the domain of hagiography. The authors stress the formidable difficulty of applying expertise, and the inordinate complexity of the real-world situations in which it is applied, and thereby seek to expose the hindsight-based critical attacks on experts, invariably occasioned when 'things go wrong', as facile, ill-informed and frequently self-serving. It is intriguing to find Collins and Pinch cheerfully using available 'best knowledge' as the basis of their own accounts of 'what really happened'; and even lamenting the absence, in one of the situations they describe, of "compelling evidence" of the kind available in astronomy.

There is nothing significantly critical of science, technology or expertise in this book. Indeed, its approach is profoundly conservative. Expertise is going to go wrong, but that is the nature of the beast. A touch of additional reserve and scepticism may be in order, a certain reflectiveness perhaps in the face of expert pronouncements, but nothing else: "We offer no policies". Even the criticism of the myth of scientific certainty is offered only for the greater good of science itself: if we expect too much of science and technology there is the danger of disillusion, of a "flight from reason", a "fall back into a dark age". In the light of all this, it is tempting to suggest that scientists do not always recognize who their friends are, although in the science wars, of course, it might have been that some scientists felt a need for enemies, and that the likes of Collins and Pinch were all they could manage to find.

It is likely that this book, like the authors' similarly designed collection of scientific controversies published five years ago, will be taken up for teaching purposes at an elementary level. The studies should stimulate valuable reflection in this kind of context, and may be used to illustrate far more themes than those discussed explicitly herein. None the less, the very narrow focus of their own discussion might be thought a disadvantage.

It is conceivable that the book will be

'balanced' in some contexts with materials stressing the positive achievements and exemplary reliability of science and technology, and 'balanced' in others with more forthright challenges to their authority and value; certainly, current trends in the mainstream of sociology are in the latter direction. Introductory textbooks, long notorious for making scarcely any mention of science and technology, are now beginning to refer to them, but mainly negatively, in relation to the rise of an alleged risk society and an increasingly threatened environment. But why are Collins and Pinch in practice so very much more positive about technical expertise than is now normal in their discipline? Perhaps part of the answer lies in the many years of close contact they have had with scientists and experts in the course of their substantive research. □

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## Causing a buzz

### Honeybees of Africa

by Howard R. Hepburn and S. E. Radloff  
Springer: 1998. 370 pp. £64.50, \$109

Thomas D. Seeley

The honeybee, *Apis mellifera*, is the familiar species used for most of the world's beekeeping. It is native to Europe, the Middle East and the whole of Africa, and has been introduced by beekeepers to the Americas, Asia, Australia and the Pacific islands. Although most scientific studies of the honeybee have been conducted in Europe and North America, and have involved the subspecies native to Europe, more than two-thirds of this species' natural distribution area falls in Africa. Across this continent the honeybee inhabits such ecologically diverse settings as lowland rainforests, semi-arid savannahs, steamy coastal swamps and cool mountain ranges.

The smallest and the largest, the blackest and the brightest, and the gentlest and the



Experimental honey-pot: African honeybees can teach us a lot about populations and gene flow.

fiercest forms of *A. mellifera* exist in Africa.

The authors of *Honeybees of Africa* describe the honeybee scene in Africa as "a magnificent natural experiment", offering a special opportunity to investigate the nature of gene flow, population structure and biological adaptation. This is because these bees have been disturbed by humans only as honey-hunters and fire-starters; more disruptive interventions such as migratory beekeeping and selective breeding are virtually unknown in most of the continent.

The book begins with one of its most significant contributions: a detailed re-examination of the subspecies classification of the honeybees of Africa based on a new multivariate morphometric analysis. By amalgamating their own database at Rhodes University in South Africa with that of the late Friederich Ruttner of the Institut für Bienenkunde in Germany, the authors were able to base their analysis on 18,175 worker bees, representing 1,000 colonies in 291 localities across the continent. The result is a superb presentation, region by region (Maghreb, Nile Valley, East Africa and so on), of the geographical variability and population structure of the African honeybees.

This morphometric analysis, together with genetic studies by others, shows that populations of honeybees thought to be homogeneous and thus defined as subspecies actually show complex geographical variation. A recurrent theme is, therefore, the problem of accommodating natural population variation in a classification scheme. Unfortunately, to name things (such as populations of honeybees) typifies them and leads to typological thinking. In the end, the authors essentially follow Ruttner's classification system of subspecies names, because names are needed to discuss things, but the reader is shown clearly the tremendous variation within the honeybee populations of the continent.

The book's other major contribution is a comprehensive review of the scientific literature. For many topics — including the seasonal migration of colonies, the curious fertility of workers in queenless colonies of *A. m. capensis*, and the diverse predators and parasites of honeybees — the authors provide the best summary available. Often, though, the discussion is necessarily thin, simply for lack of information.

*Honeybees of Africa* provides biologists with an excellent source of information and challenges. I applaud the authors for thoroughly synthesizing what is known about *A. mellifera* across the whole of Africa, thereby setting the stage for countless exciting discoveries. □

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