

disciplinary presentation of the facts. Its only omissions are the importance of private conservation as a stepping-stone for devolved wildlife management, and why wildlife offers an economic solution in some of Africa's agriculturally marginal environments.

Southern Africa has collectively grasped the nettle, taking a leap that has revolutionary implications for conservation practice. Deeply committed scholar practitioners attempted to fast-track the empowerment of communities. But although it was initially highly successful, this strategy is now facing the challenge of 'aborted devolution', as politically motivated elite groups try to grab wildlife resources for themselves. The book offers the frank and honest observation that, although the underlying concepts appear to hold and to offer the best way forward, most community-conservation initiatives survive only through the efforts of rare individuals or by external financial support.

There is sufficient evidence that community conservation, when properly applied, works, and can do the greatest good for the greatest number. Yet proper application remains the exception rather than the norm. Its weakness lies in the assumption that the concept of the greatest good is a winning formula for bringing about institutional change. Particularly in non-democratic countries, there is much evidence to the contrary. ■

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A lament for Italy's brain drain

Cervelli in Fuga
sponsored by the ADI (Associazione
Dottorandi e Dottori di Ricerca Italiani)
Avverbi: 2001. 189 pp. 9.29 euros

Roberto Battiston

There is a ghost wandering through Italy. It is a small, wasp-coloured book written by a group of brilliant young minds, born and educated in this beautiful country but living and working elsewhere. This disturbing book, sponsored by the ADI — the organization of Italian doctoral students and research doctors — is receiving a lot of attention and is to be found on the desks of an increasing number of academics, politicians and decision-makers throughout Europe.

The book, *Cervelli in Fuga* ('brains on the run'), describes the dark side of public research in Italy — its selection and promotion procedures, the corrupt foundations on which everything else is built. Over the past 30 years, periodical mass hirings or promotions in the research sector (the infamous "ope legis", that is, hiring or promoting by law) have lowered competitiveness. During the past five years, a new law regulating professorship promotions has practically ended the exchange of professors between Italian universities and research institutes. The effects of these distortions are far-reaching,

as shown by the recent scandal over the selection of directors for the newly formed National Research Council institutes — radical change in the appointment procedure had been promised, but the reality indicated 'business as usual'.

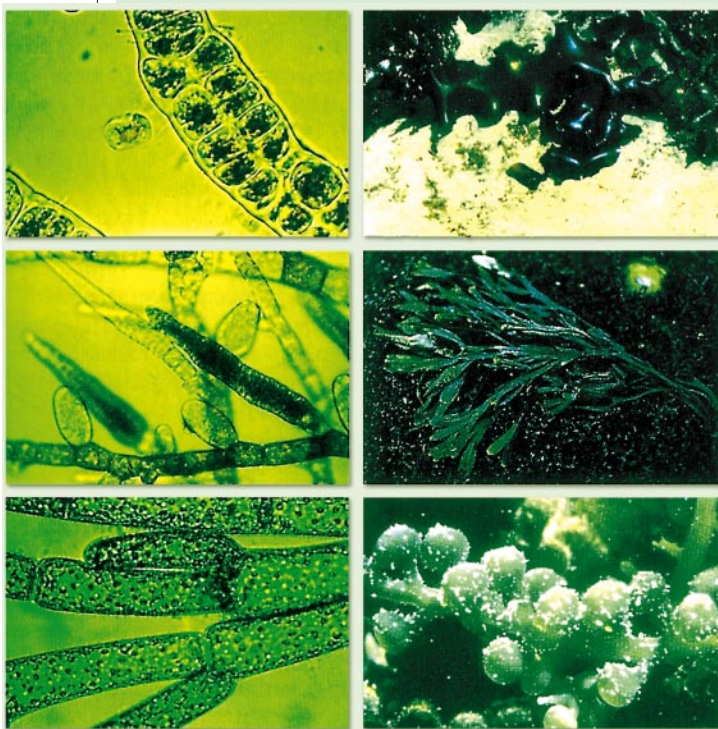
Every Italian knows about these problems, but this book gives a unique account of those directly affected which brings the message home powerfully. It explains, through 21 short autobiographical essays, why so many talented Italian scientists choose to work in other countries. The stories are honest and revealing.

Leaving a country is not intrinsically a bad thing to do in a world where everything is shared across continents, particularly science. But the message conveyed in these essays is one of humiliation. The authors, among the best minds of their generation, are strongly motivated and ready to take on the difficult life of academic research. But they say they had to leave to save themselves. They explain that it was not just a question of finding an academic position, but, more importantly, of retaining the feelings that are essential for a scientist. For example, Nicola Terrenato, a 37-year-old archaeologist who studied at the University of Rome and is now assistant professor at the University of North Carolina at Chapel Hill in the United States, deplores the fact that young scientists in Italy are under constant pressure to defer to their professors. He writes: "I am still moved when I find myself writing what I think, without indulging in concessions or unnecessary citations, and I realize that, had I remained in Italy, I would never have understood what I understand here."

Those who leave are often among the best. They are more motivated, but also less patient. Those who are good at merging into their boss's shadow, the 'portaborse', the yes-men, the academically cunning, those who learned from their family how to get on (Italian academic nepotism is a well-known plague), have a far higher chance of entering the system — a pernicious reverse-selection process described in a lively essay by Luca Ferrasin, a runaway research associate from a northern Italian university, now a contented lecturer at the Bristol Veterinary School in England.

The book also contains half a dozen contributions that analyse the position of the Italian university, its legal background and perspectives. In his essay "Inconclusive conclusions", Augusto Palombini, a doctoral student in archaeology and one of the main contributors to the book, summarizes Italy's "feudal culture", which has such ineffective selection procedures that the average age of an Italian research associate (the first level in the hiring process) is still today an appalling 45 years. Before blaming the lawmakers, he says, individual academics must bear some of the responsibility. But he admits that

Weeds' watery ways



The diverse size and shape of sessile marine organisms such as the seaweeds shown here are strongly influenced by their environment as well as their genome. *The Algorithmic Beauty of Seaweeds, Sponges, and Corals*, edited by Jaap A. Kaandorp and Janet E. Kübler (Springer, \$49.95, £35), describes how simulation models can throw light on the growth and structure of these organisms, with particular emphasis on seaweeds, sponges and corals.

things seem to be moving in the right direction, albeit slowly. For example, the level of funding for research has increased; in 2001, Giuliano Amato's government devoted an additional 450 million euros (US\$388 million) to research, using money from an auction of telecommunications licences — although this measure has not been repeated for 2002 by Silvio Berlusconi's government. Italy invests about one-third of the percentage of gross domestic product that Japan spends on research, although resources are starting to be distributed on a more rational basis, involving peer review. However, Palombini points out that simply putting more money into a system that contains too many people who do not share the same values of merit and competition is no guarantee of success.

Most Italian universities are still capable of producing highly talented scientists. Burton Richter, Nobel prizewinner and professor of physics at Stanford University in California, knows the Italian system well, being a member of an international committee charged with reviewing the Italian National Institute for Nuclear Physics. As he writes in this book, he does not understand how Italy can afford the social cost of this continuing brain drain, particularly in the absence of a brain gain from other countries, which is hampered by the bureaucratic and parochial selection system in Italy, as well as by poor funding. I don't understand it either. But reading this book gave me a better idea of the causes and consequences of this process. ■

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The answer lies in the soil

Understanding Soil Change: Soil Sustainability over Millennia, Centuries, and Decades
by Daniel D. Richter Jr & Daniel Markewitz
Cambridge University Press: 2001. 272 pp.
£47.50, \$69.95

David Schimel

This marvellous little book tells the story of southeastern US ecosystems from the perspective of soil changes over timescales of decades, centuries and millennia. I was delighted with the author's organizing of processes into timescales. This is a natural way of thinking about soil and ecosystem processes, but is more often given lip-service than actually used as an organizing principle. In this case, it works, both because the soil processes — from weathering and geomorphic evolution, through leaching and decomposition — fall into this framework,

and because human impacts also change on these timescales.

The first part of the book provides a clear and conceptual overview of the elements of soil science, and their links to human management of soils. The authors demonstrate clearly that sustaining soil "health" is essential to sustaining human societies, and that soil change is linked to historical change in human economy. They then introduce the system that is the focus of their study, the Calhoun Experimental Forest, a property in South Carolina procured during the regional collapse of unsustainable agricultural practices of the southern United States in the first part of the twentieth century.

In the second section, which addresses millennial processes, they review pedogenesis (soil formation) globally and in the old soils of their target region. Here we begin to see the fruit of the sustained research effort at the Calhoun site, as the processes leading to the acid soils of the region are carefully documented in terms of geomorphic, geochemical and biological dynamics. Key findings include the role of biologically generated acidity in attacking the soil's primary minerals.

The third section addresses the centennial timescale. It includes a history of the agricultural development of the South, drawing attention to the little-known intensive maize cultivation system of the indigenous Americans before the arrival of Europeans. The authors provide a detailed analysis of the sustainability of this system, and the human and landscape conditions that allowed its success. They then provide a unique perspective on the 'Old South's' cotton economy in terms of agricultural management and the biogeochemistry of the cotton economy. The discussion on the legacy of cotton growth in today's soils makes fascinating reading, blending political and economic history with soil chemistry. The authors conclude that the previous two centuries of agriculture have affected soils to great depth (two metres) and will continue to affect ecosystems well into the future.

The authors next describe a period over recent past decades during which agricultural land over huge areas in the southeastern United States has reverted from farmland to forest. This is the timescale of the Calhoun experiment and describes in detail the recovery of carbon and nitrogen in soils of the regrowing forest. The rapid and massive response of soil to the re-establishment of forests is astonishing. The Calhoun soils re-establish soil acidity, carbon content and a functioning nitrogen cycle that can effectively retain inputs. Likewise, phosphorus chemistry changes as a result of the increase in organic matter and the associated effects of acidity on the inorganic chemistry of this element. The degree of knowledge of soil processes documented for



Down to earth: the Calhoun experiment has studied soil–ecosystem changes over 43 years.

this site is equalled for only a very small number of other locations.

The final section of the book outlines a research strategy based on a proposed network of long-term soil-research sites and careful experimental design. This proposal, in which the authors argue for a research paradigm based on replicated manipulative experiments, is founded on experience both at the Calhoun site and in other long-term ecosystem studies. While the utility, value and rigour of this approach need no comment, the authors themselves have shown the additional value of a perspective that takes into account the dynamics and legacies of millennial and centennial landscape processes. Decades-long experiments, using conventional manipulation and replicated plots, cannot address the role of slow pedogenic and landscape-scaled processes. For this, the analytical paradigms of the geophysical sciences could be useful, as they can address entities (such as ecosystems) for which replication is a challenging problem, which are difficult to manipulate, and which respond on long timescales. The dependence on fisherian statistics and classical experimental design in soil science is a legacy from agronomy, not altogether suited to large-scale, long-term processes.

This book fills an important niche in the biogeochemical literature, and not only as a regional case study. Forest ecosystems play a large part in global processes, affecting the

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