

such different 'currencies' used? For instance, what if I am writing a very nice book review just because one of the editors of the book fed me five years ago on the night when I went to Cambridge for the first time and the college dining room was closed?

All of the 10 chapters on nonhuman primates deal with baboons, macaques, vervets, chimpanzees and gorillas. This bias represents the overall bias in current primatology toward Old World terrestrial monkeys and apes. Very new perspectives may appear as studies on lemurs, New World monkeys and colobines progress.

Three chapters on humans approach the problem of alliances in

the arenas of social psychology, ethological study of children and international politics. However, in spite of the editors' effort to connect these studies with other chapters on animals, one cannot deny the impression that the gap between zoology and social science is still large.

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Plant Defences

Plant Resistance to Herbivores and Pathogens: Ecology, Evolution and Genetics

edited by Robert S. Fritz and Ellen L. Simms, *University of Chicago Press, 1992. £59.95/\$75.00 hbk, £23.95/\$29.95 pbk (600 pages) ISBN 0 226 26553 6/0 226 26554 4*

Multiauthored volumes can be classified broadly into those resulting from the proceedings of a conference or workshop and those commissioned to cover some particular topic independent of an associated meeting. All too often even the better volumes of the former type are uneven in coverage of their chosen topic – a feature presumably reflecting the twin editorial constraints imposed by the talents of the authors who actually attended the meeting and the desire to publish proceedings before their topicality is lost. These constraints are far less severe on editors of multiauthored volumes of the second type. As a consequence, however, most readers have higher expectations of such works, requiring at least a comprehensive and even coverage of the current state of development of the nominated topic.

How well does *Plant Resistance to Herbivores and Pathogens* fulfil such expectations? The book is divided into an introductory chapter and four parts: 'Analysis and inheritance of resistance variation' (three chapters), 'Evolutionary responses to plant resistance by herbivores and pathogens' (four chapters), 'Population and community responses to plant resistance vari-

ation' (four chapters) and 'Evolution of plant resistance' (six chapters). My first impression on looking down the list of chapter titles was of a strong emphasis on herbivores rather than pathogens. Of the 18 chapters, 11 seemed to be associated with herbivorous insects, three with pathogens, while the remaining four had more general titles. In itself this is not unreasonable given the considerably greater amount of effort that has been devoted to plant-herbivore compared to plant-pathogen interactions in natural communities over the past few decades. However, dipping into the substance of each chapter did indicate that attempts to integrate information from both insect and fungal realms were generally half-hearted. Ironically, the best example of such integration is Wilhoit's chapter concerning evolution of virulence in variety mixtures – its title is specifically directed at herbivores. On the other hand, the most glaring omission is in the treatment of the genetic basis of resistance to pathogens.

In many ways our understanding of the genetic control of resistance to pathogens is far superior to the same understanding with insects. Yet, in the most logical place for an integrated treatment of this topic (Kennedy and Barbour's chapter), pathogens are dismissed in a single sentence as having been reviewed previously by several authors. Reading this book as I did with a pathological bias, I found this omission incomprehensible. Various highly potted versions of Flor's gene-for-gene hypothesis¹ do pop

up in the book; however, the lack of a concerted treatment of the genetics of resistance to pathogens possibly explains why no attempt is made to consider, in any depth, questions like why gene-for-gene relationships have been documented or proposed in many plant-pathogen interactions but are apparently very infrequent in plant-herbivore ones.

Despite these criticisms and some sloppy proofreading, there is still much to recommend this book. Many of the chapters are excellent, stimulating new ideas and reappraising existing tenets, while several others provide valuable considerations of methodological questions. Furthermore, despite the relatively long gestation period of the book (I was first aware of its development four years ago) the chapters are all dotted with references to recent studies. Certainly, some chapters are weaker than others, but overall this book provides a reasonably comprehensive picture of most aspects of the interactions that occur between the attacks of herbivores or pathogens and plant resistance. With its extensive reference list, it provides a very rapid entrée to most of the world of plant resistance and will serve as a useful reference source for some time to come.

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A Politician on the Environment

Earth in the Balance: Ecology and the Human Spirit

by Senator Al Gore, *Houghton Mifflin Company, 1992. \$22.95 hbk (407 pages) ISBN 0 395 57821 3*

Books written by politicians are rarely reviewed or discussed in scientific journals. Nevertheless, US Senator Al Gore's recent book *Earth in the Balance* deserves critical attention, largely because of Gore's reputation as a leading political expert on the environment, his considerable influence in Washington and his formidable political aspirations – he sought the Democratic party's presidential nomination in 1988 and is the

party's vice-presidential nominee for the 1992 election.

Earth in the Balance is a detailed and thoughtful discussion of environmental problems. The book is divided into three parts: balance at risk, the search for balance and striking the balance. The 15 chapters, framed by an introspective introduction and conclusion, include a handful of graphs, diagrams and photos. Gore provides extensive notes on his sources of information as well as a bibliography and index.

Individuals unfamiliar with Gore will be surprised by *Earth in the Balance*. He seems genuinely interested in scientific ideas and continually provides refreshingly clear and accurate discussion on a range of topics that we hardly expect politicians to be interested in, let alone address publicly. Gore devotes significant space to discussion of the scientific uncertainties associated with environmental problems – how politicians have used them as excuses for inaction, what such uncertainties really mean, and how policy makers must deal with them. He also understands the important role played by the media in magnifying the public's perception of scientific uncertainty, and he repeatedly recognizes the different spatial and temporal scales at which human populations influence the environment.

The eight chapters in Part 1 are profound in their vision and clarity. Gore has engaged in an impressive amount of research, going beyond the popular literature by delving into primary sources and conversing with leading scientists. Chapter 1 provides a succinct overview of the environmental crises we face, while chapter 2 outlines our failure to perceive and respond to them. In chapter 3, Gore offers a fascinating overview of historical climatology to show how climate has influenced human civilizations. He reviews a range of climate-induced famines and uses these far smaller and more temporary events to illustrate the severity of even the conservative projections for global climate change. In chapter 4, he distinguishes among local, regional and strategic pollution, concluding that the most strategic threats are ozone de-

pletion, decreased oxidation potential (reduced atmospheric cleansing) and global warming. Chapter 5 discusses what Gore considers to be the major strategic threats to the global water system, and chapter 6 focuses on the characteristics, functions and wholesale destruction of the world's forests. Chapters 7 and 8 offer excellent discussion on the importance of genetic diversity in agricultural systems and the immense environmental problems caused by the vast amounts of waste that our society generates.

There are remarkably few areas in Part 1 where Gore appears muddled – and in most cases, this confusion does not detract greatly from the strength of his arguments. My primary complaint concerns Gore's obsession with balance, a theme that pervades the entire book (e.g. the balance of nature, earth out of balance, the world's ecological balance), and is most apparent on page 11, when he defines ecology as 'the study of balance'. Had Gore read the likes of Botkin¹ and Pickett *et al.*², the public might have received a needed lesson on what Pickett *et al.* refer to as 'the flux of nature'. Gore is again confused about the 'interrelationships of nature' when he discusses 'the symbiosis between [tropical] forests and rain clouds' in chapter 5.

In the five chapters comprising Part 2, Gore offers his thoughts on why human societies have allowed such environmental dilemmas to arise. Toward this end, he starts out strong, with an eloquent discussion of how and why politicians and political systems have failed to address urgent environmental crises (chapter 9). He then provides a valuable introduction to the growing field of ecological economics and exposes the ridiculous and environmentally tragic assumptions of classical economics (aptly referred to by Gore as 'powerful magic'): goods are produced from limitless supplies of natural resources, and the production and consumption of these goods generates no unwanted by-products (chapter 10).

While chapters 11–13 are liberally sprinkled with insights, they are woven into a philosophical, psychological and religious fabric that I find unnecessary, and often disagree with. In chapters 11 and 12, Gore argues that we are being overwhelmed by information and technology, and becoming a 'dysfunctional civilization'. In chapter 13, he needlessly launches into 28 pages of 'environmentalism of the spirit'. Previously articulate and logical, Gore now drifts into a rambling

commentary on the environment, religion and science – going to great lengths to refute the view that Christianity has encouraged environmental destruction, and then discussing the separation of science and religion, contending that '... there is now powerful impulse in some parts of the scientific community to heal the breach [between science and religion]'. In Part 3, Gore returns to his previous strong form. In chapter 14, he outlines 'a new common purpose' and the need for preservation of our global environment to become '... the central organizing principle of our civilization'. Finally, in chapter 15, Gore offers an extraordinary 'Global Marshall Plan'. He proposes five strategic goals for preservation of the global environment: stabilization of the world's human population; rapid development and deployment of environmentally appropriate technologies; comprehensive changes in the system of economic accounting so as to accurately reflect the effects of our actions on the environment; establishment of a broad range of international agreements that will create the political frameworks necessary for the plans' success; and a comprehensive global scheme for environmental education and scientific research. For each of these goals, Gore clearly outlines its importance and provides extensive details on a range of more specific objectives.

Despite my misgivings about Part 2, this book is a grand success, as it should profoundly influence politicians and the general public. In addition, it offers the scientific community needed encouragement, an articulate synthesis of global environmental issues and a glimpse of the political initiatives needed to provide solutions. *Earth in the Balance* reveals that we are fortunate to have someone who is so able and willing to bring important ecological issues to the forefront of the political arena.

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Correction

Price, T. and Langan, T. *Trends Ecol. Evol.* 7, 207–210 (September 1992):

Reference 35 at the end of the second to last paragraph should be Ref. 34, and Ref. 25 in the last paragraph should be Ref. 35.