

D₃, D₄ and D₅ subtypes are inhibitory. The article on 'pineal gland', often referred to as the third eye, deals with pineal physiology and its role in communicating the effects of light to a variety of biologic rhythms. Its role ranging from free radical scavenger to shifting the sleep-wake cycle resulting in jet lag needs to be understood. A couple of articles address the role of signalling molecules involved in smooth muscle cell and cardiac function. C-Ha-ras and Osteopontin genes are critical molecular targets in oxidant-induced atherogenesis. The induction of atherogenic vascular smooth muscle cell types by chemical injury exhibits remarkable parallels to those seen in other forms of atherogenesis. Similarly, cardiac β -adrenergic receptors, which respond to neuronally released catecholamines, are important regulators of cardiac function. However, whether this is a contributory factor or a result of ventricular dysfunction is not clear. A general article on the 'regulation of gene expression by reactive oxygen' discusses the source of reactive oxygen species (ROS), the signal transduction pathways activated by ROS and the transcriptional regulation of ROS-induced genes of toxicological interest. Finally, the article on 'cyclins and cell cycle' check points elaborates the role of cyclin-dependent kinase inhibitors such as P21 and P16 in cell cycle control. The target sites for anticancer drugs in terms of cell cycle check point controls, cell cycle regulatory proteins and contributory factors to resistance against chemotherapy are all discussed.

This book covers a wide range of topics, but in depth. The unifying theme stems from the progress made at the molecular level in terms of signal transduction pathways and the structural and functional role of a variety of receptor and transducing elements. The new tools available, namely the transgenics and knockouts as experimental animals and approaches based on antisense therapies have ushered in a new era for rational drug discovery. The book is an attestation to the scientific soundness of this rational approach.

G. PADMANABAN

Department of Biochemistry,
Indian Institute of Science,
Bangalore 560 012, India

Environmental Governance: The Global Challenge. Lamont C. Hempel. Affiliated East-West Press Pvt Ltd, 104, Nirmal Tower, 26 Barakhamba Road, New Delhi. 1998. pp. 291. Price: Rs 125.

On the threshold of the new millennium mankind is flooded with dismal environmental statistics that afflict the sensitivities of people with numbness and a feeling of resignation. 'In an average day, an estimated 260 thousand people are added to the world's population, 30-100 species of plants and animals are prematurely extinguished, over 90,000 new motor vehicles take to the road, 57 million metric tons of carbon dioxide are released to the atmosphere from the burning of the fossil fuels, over 42,000 hectares (162 square miles) of tropical forests are destroyed . . .', etc.

Lamont C. Hempel, in his finely crafted work *Environmental Governance*, draws us away from highly publicized events like the disasters of Bhopal and Chernobyl and ozone holes of Antarctica, into the rarified field of holistic environmental management. He addresses with equal ease global as well as regional issues. Rightly sensing the shortcomings of a sovereign state-centred approach to environmental problems, which are both transnational as well as local, Hempel advocates political institutions of 'glocal' kind, in which environmental authority is redistributed to both supranational entities and local communities.

Hempel likens the Earth Summit to a climbing expedition 'in which the mountaineers, all linked by a frail rope, were forcefully confronted with the advantages and disadvantages of interdependence. Split into coalitions of the rich and the poor, the participants spent much of their time arguing about how to finance the climb and about which members were most prepared to lead. Reaching an impasse, the expedition eventually succumbed to the law of the "retarding lead," . . . whereby the most cautious and powerful members got to set the pace and to determine the route to the summit.' The major gloomy note at the Earth Summit was struck by the unwillingness of the overconsuming rich and the overpopulated poor to accept responsibility for their own contributions to ecological destruction. The author rates the coming together of the world's NGOs at Rio, several thousand representatives of the people

who negotiated unofficial treaties and strategies in a shadow summit, as one of the achievements of the Earth Summit. Their banners proclaimed, in Gandhi's words, 'If the people will lead, the leaders will follow.'

Environmental destruction is generally attributed to the actions of a relatively small number of thoughtless and careless individuals, or to some passing phase of industrial recklessness that accompanies an otherwise 'benign evolutionary process of economic development'. Hempel, on the other hand, attributes the destruction to driving forces that are 'pervasive, persistent, and deeply ingrained in our values, lifestyles, and institutions'. Deep ecologists, economists, technologists and humanists differ on where to place emphasis in facing environmental problems. The author rightly feels that they can agree on the action required on many different fronts using a variety of strategies and approaches.

The threat of global warming, for instance, is the outcome of several human actions for which the entire humanity contributes. Anthropocentrism, contemporism, galloping population, technological growth, poverty as well as affluence contribute to global warming. Villagers corrode the forest wealth for firewood and clear vegetation for growing crops and grazing livestock. The burning of trees contributes up to 25% of the excess carbon in the atmosphere. Economists have attempted to calculate the impact of climate change and pollution caused by human beings and even advocated environmental taxations like carbon tax but the markets are not designed to accommodate these, thereby passing the buck to posterity.

Despite great progress in international level policy making to counter environmental problems, protection of the earth's environment in the 21st century remains elusive. While expressing satisfaction over the rising environmental consciousness and positive responses from nations, the author urges NGOs to persuade their governments and fellow-citizens that the most pressing challenges we face are largely glocal (global as well as local), that require glocal responses. His main prescription is, 'Utopian as it may seem, a constitutionally based world federation that can link communities and regions.'

There is greater openness in the world's economic structure than in its political structure. The allure of money is so great

that defenders of national sovereignty, who go out to fight environmental globalism, expressing apprehension that the strong nations will reap greater benefit, however fall easy prey to economic globalization. State-centred environmentalism is equally baneful to the biosphere as the growth of global political economy. As the idea of state sovereignty runs supreme in environmental governance the local communities are forgotten. Environmental governance should be a happy blend of global and local, a system of governance more representative and less bureaucratic in nature.

Hempel strongly feels that human impact on nature is probably best managed at the local level, with higher political structure to coordinate local actions and to harmonize them with legitimate national, regional and global interests. No serious environmental mobilization will take place at the international level in the absence of community-based ecological literacy and activities. Unfortunately, teenagers today are plunged in the challenges and excitement in the global mindscape rather than in the local landscape.

This book is all the more important for Western societies grouping to trace out their roots. 'It seems that community roots continue to be lost in the scramble for global wings.' In fact ecologists in India have already been working on the theme of participation of local communities in environmental governance over the last one decade, preceding the emergence of the 'glocal' concept of Hempel. The Kerala Sastra Sahitya Parishat carried out documentation and management of natural resources at the village level in Kerala. India is experimenting with diverse management systems, involving people's participation in the governance of forests. The Joint Forest Management System, involving village communities and forest departments, is poised for greater progress. *Srishtigyaan, A Methodology Manual for People's Biodiversity Registers*, prepared under the guidance of Madhav Gadgil, is envisaged as a village or panchayat level record of knowledge, perceptions and attitudes of people towards biodiversity, its utilization and conservation. Recent years have witnessed the arrival of a flurry of literature, on environmental governance involving local level institutions and the state. In *Nurturing Biodiversity: An Indian Agenda*, Madhav Gadgil and Seshagiri Rao present an alternative strategy for managing

India's biodiversity which begins at the level of *gram sabhas* of the village, rises to the levels of districts, states and nation and finally gets linked to the international forces.

Hempel's work provides a broader conceptual framework highlighting the importance of linking local level institutions with global ones, transcending the boundaries of nations, without in any way compromising their integrity. It paints a hopeful future, that mankind has a way to get out of environmental catastrophes threatening the fragile ecology of the planet. Norman Myers compliments, 'All of us can wax eloquent about environmental problems, fewer of us are articulate about their solutions. Lamont Hempel explains how we can get from hopeless here to give-ourselves-a-chance there. As an antidote to doomsday depression, read this book.'

M. D. SUBASH CHANDRAN

Department of Botany,
Dr Baliga College of Arts and Science,
Kumta 581 343, India

A Neotropical Companion – An Introduction to the Animals, Plants and Ecosystems of the New World Tropics. John Kricher. Princeton University Press, 41, William Street, Princeton, New Jersey 08540, USA. 1999. pp. 451. Price: US \$ 18.95.

Those who have ever been in tropical rainforests may have experienced a sense of awe that cannot be easily described in words. The feeling of awe and fascination can be many times over when within the rainforests of Central and South America – the neotropics. The noisy flocks of parrots, their extraordinary colours and size, toucans, quetzals, howler and spider monkeys and the array of strikingly coloured butterflies and frogs leave an unforgettable impression in all those who have even once stepped into the neotropical wilderness. It is this amazing biodiversity – epiphyte-laden gigantic trees, and the not often seen yet tremendously diverse insects, fish, amphibians, reptiles,

birds and mammals that made the early European explorers often come up with exaggerated accounts of the neotropical forests in general and Amazonia in particular.

Not until naturalists like Charles Darwin and Henry Bates came out with their accounts in the mid-late 1800s, did the 'mysteries' of neotropical ecosystems come to be explained in scientific terms. And since the 1970s, North American and European biologists have really thronged the neotropics in their quest to answer questions on what determines biological diversity, how species coexist and the like. In fact, biologists rushing into the neotropics during the past 25 years is quite reminiscent of the earlier 'gold rush' in the region.

Neotropics are however not all rainforests. While much of the region is indeed covered by the world's most diverse and extensive rainforests, there are other major ecosystems that have contributed to the overall biological wealth of the neotropics. These include amongst others, the Amazon and Orinoco river basins (created by two of the world's largest rivers), the Andes and the vast stretches of South American grasslands. It is generally believed that about a third of the earth's species may be found within the neotropics.

The book under review is an excellent effort in synthesizing scientific facts and popular fantasies of the neotropics in a style most appealing to both students of biology and lay readers. The first few chapters of the book provide the most comprehensive review of scientific literature on the neotropics. Examples illustrating the functioning of various components of complex neotropical ecosystems – especially the rainforests, have been drawn from the results of long-term studies in Barro Colorado Island (Panama), La Selva (Costa Rica) and to a lesser extent from Manaus (Amazonia).

Many interesting theories were put forth during the 1970s on the extraordinary speciation in the neotropics. Chief amongst these was the theory by Haffer which proposed that during the Pleistocene glaciation, forest refugia were created throughout the neotropics (also elsewhere) within which organisms evolved in isolation into newer species. Forest refugia were reconnected during more favourable wet periods giving rise to the pattern of super-numerous species assemblages that currently characterize