

chapter, the authors demonstrate that the global energy problem is linked to other major problems such as North-South disparities, environmental degradation, climate change, population explosion and nuclear weapons proliferation. In the second chapter, the authors propose an end-use-oriented energy strategy for developed countries. They begin with a criticism of the techniques normally used to predict future energy demands. These techniques extrapolate from past experience and hence do not allow for the increase in energy efficiency through new technology. The authors demonstrate that new technologies can reduce energy consumption in residential, commercial, transportation and industrial sectors. The last section of this chapter provides a detailed account of the end-use-oriented energy future for Sweden and the United States. The authors show that if energy-efficient devices are used the gross national product of the United States can be doubled while reducing the per capita energy consumption to half the present value.

In the third chapter, the authors address the issue of energy strategies for developing countries. They highlight the low level of energy services in developing countries. They discuss in great detail the important role played by non-commercial energy (such as firewood) in developing countries. They demonstrate that a per capita energy consumption of around 100 MJ per day will be sufficient to satisfy all the basic needs of people in developing countries. They arrive at this conclusion after a detailed analysis of the energy consumption pattern in residential, commercial, transportation, manufacturing and agriculture sectors in Western Europe, Japan, New Zealand and Australia. Many developing countries have approached the per capita energy consumption of 100 MJ per day. This indicates that the major problem in some of the developing countries is the inefficient use of energy and the uneven distribution of energy consumption within different classes in these countries.

The authors provide specific guidelines for energy strategies in developing countries. These include the use of animate energy, renewable energy, efficiency improvements and synergism. By synergism, the authors mean the beneficial impact of the combined and cooperative effect of measures taken in

two different sectors of the economy. They illustrate the concept of synergism through a case study of the Brazilian ethanol programme.

In chapter 4 the authors discuss the future global energy demand and supply. They argue that the global energy demand in the year 2020 need not be much higher than that in 1980. This result is quite different from the conventional wisdom of energy planners that the demand in 2020 will be twice or thrice that in 1980. The result obtained by the authors of this book is based on the assumption that the new energy-efficient technologies will be fully utilized. The authors believe that the availability of fossil fuels in the future may be influenced by concerns regarding global warming. They do not foresee a bright future for nuclear power on account of the concern regarding nuclear weapons proliferation. The major conclusion of this chapter is that the economic and social goals of developing and developed countries can be achieved without any increase in the global primary energy consumption. The authors caution that this goal can be achieved if and only if the preoccupation of the energy planners with energy supply is changed. Energy planners must be more concerned with providing energy services more efficiently. The authors reiterate the fact that energy is not an end in itself. The energy is needed to achieve certain economic goals. If the goals can be achieved with less energy expenditure it reduces the pressure on energy supply.

In chapter 5, the authors indicate the policies that will be necessary to implement the energy strategies suggested by them. They provide a detailed account of the various approaches, such as market mechanisms, administrative allocation of energy carriers, regulation and taxes. Many readers of the book may find the approach outlined by the authors to be reasonable but may wonder whether they can be actually implemented. This issue is discussed in the last chapter, wherein the authors contend that market intervention will be necessary to promote more efficient use of energy. The authors have not, however, discussed in detail the problems in adopting a new energy efficient technology on account of the scarcity of capital. The authors claim that the approach advocated by them will be easier to implement than the conven-

tional strategy of continuous increase in energy supply. The book contains two appendices. Appendix A provides a brief overview of renewable energy technology and its potential. Appendix B contains a glossary of terms, useful data, definitions, and energy conversion factors.

The book provides for the first time a new paradigm for energy planning. Anyone concerned with the issues related to energy cannot afford to miss this book. This book has been already cited widely by those concerned with environmental degradation and global warming. It must be made compulsory reading for our energy planners and bureaucrats. I wonder, however, whether energy planners will find it easy to abandon the old paradigm and adopt the new paradigm suggested in this book. The energy planners wedded to the old paradigm may be forced to abandon it because the amount of capital necessary to construct more and more power plants is not easily available.

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## What's hot in biochemistry

**Annual Review of Biochemistry 1991**, vol. 60. Charles C. Richardson. Annual Reviews Inc., 4139 El Camino Way, Palo Alto, California 94303, USA. Price: US \$ 41, elsewhere \$ 47.

Annual Reviews Inc. bring out volumes reviewing areas ranging from anthropology and psychology to astronomy and nuclear science. The appearance of a review is a good indicator that the area has seen a large volume of published work over the previous five years or so. Perusing the *Annual Reviews of Biochemistry*, Vol. 60 (and the current volumes of other areas in the life sciences) I was struck by the large number of articles on a small number of areas. The structure and

## BOOK REVIEWS

function of proteins involved in information transfer has been extensively reviewed: Kaziro *et al.* (Structure and function of signal transducing GTP binding proteins), Bourret... Simon (Signal transduction pathways involving protein phosphorylation in prokaryotes), Chinkers and Garbers (Signal transduction by guanylate cyclases), Lefkowitz (Model systems for the study of seven-transmembrane-segment receptors), all in *ARB*; Julius (Molecular biology of serotonin receptors) in *AR Biophys. Chem.*; Blumer and Thorner (Receptor G-protein signalling in yeast) in *AR Physiology*. The related area of transport systems has also received attention, with two reviews in *ARB*, one in *AR Biophys. Chem.*, and another in *AR Genetics*. Finally, the protein folding problem has been covered: Ellis and Van der Vies (Molecular chaperones), and Dill and Shortle (Denatured states in proteins), both in *ARB*; and Nilson

and Anderson (Proper and improper folding of proteins in the cellular environment) in *AR Microbiology*.

Most of these reviews are extensive and go into considerable depth, discussing the material being reviewed rather than listing an impressive bibliography. In many cases the two objectives could not be simultaneously satisfied, and the former objective won out. This is a marked improvement over reviews in the seventies, some of which were principally a compilation of papers published over the period of review.

Lefkowitz's review of seven-transmembrane-segment receptors is typical of the reviews in the volume. It correlates studies on rhodopsins,  $\beta_2$ -adrenergic receptors and  $\alpha$ -mating factors in yeast. Despite relatively little sequence similarity among these families of molecules, their three-dimensional structures are likely to be quite similar and their modes of action remarkably so. Had

this review appeared a couple of years later, it would probably include taste receptors, which have been recently cloned and shown to consist of seven transmembrane segments (Bill C. Hia and Filo Mena, *The Straits Times*, 18 March, 1992). The functional profile expected has been spelt out in some detail in the review and it will be interesting to see if the taste receptors also follow the general trend.

Unfortunately, the price of the series puts it out of the reach of most individual researchers in India, but they are invaluable additions to any library catering to biochemists/molecular biologists.

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## MEETINGS/SYMPOSIA/SEMINARS

### International Symposium on Pollination in Tropics

Place: Bangalore, India

Date: 8-13 August 1993

'Pollination biology' being the central theme, the symposium is planned to cover the following topics: Flower biology in relation to pollination; insect behaviour in relation to pollination; pollination by insects and other animals in natural communities; insect pollination in commercial production of seeds and fruits; pollination problems in tropical crops; conservation and management of pollinating insects; population dynamics of pollinators.

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### Ninth International Congress of Cybernetics and Systems

Place: New Delhi, India

Date: 18-23 January 1993

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### Institution of Chemists (India): Associateship Examination, 1993

Date: November 1993

Contact: Honorary Secretary,

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