BOOK REVIEWS

Annual Review of Biophysics and Biophysical Chemistry, Vol. 16, 1987, pp. 632, (ed.) D. M. Engelman, (Published by Annual Reviews Inc., 4139 El Camino Way, Palo Alto, California 94306, USA) Price: USA $ 47, Elsewhere $ 50.

The 1987 issue of *Annual Review of Biophysics and Biophysical Chemistry* contains a total of 25 articles covering a variety of topics including structure and function of membranes, proteins, antibody-antigen recognition, nucleic acid structure, spectroscopic techniques, membrane transport and ion flux.

Luzzatti *et al* (pp. 25–48) report the chemical nature of lipids of thermophilic prokaryotic organisms. It appears that the nature of lipids is more strongly correlated with the phylogeny of the organism than with the temperature of growth. Another article (pp. 69–72) presents structural studies on halophilic proteins from archbacteria. It is observed that the proteins from these bacteria have a higher content of acidic residues and bind an unusually high amount of water and salt, in comparison with the corresponding proteins from eubacteria. However, the differences presented appear to be insufficient for a molecular understanding of the ability of halophilic organisms to survive in high salt conditions.

Several articles deal with protein structure and folding. The article by Schellman (pp. 115–138) argues for fruitful application of classical thermodynamics to problems in protein folding, due to recent advances in high precision calorimetry. The article on pp. 351–374 gives an account of the so-called density modification procedures for improving images of protein-electron density maps obtained through X-ray diffraction studies. The details of molecular interaction between lysozyme and the Fab fragment of antilysozyme antibody are presented on pp. 139–160. The surface area of the two proteins involved in molecular interaction is rather large (70 $Å^2$) and no conformational change is observed upon complexation. This limited example seems to suggest that the antigen-antibody recognition is through a lock and key mechanism. Most antigenic determinants on protein surfaces are likely to contain segments of polypeptides separated in the primary sequence. Saenger presents a lucid account of the structure of water around cyclo dextrins, proteins and nucleic acid molecules (pp. 93–114). Different models proposed for explaining haemoglobin cooperativity are presented and a proposal for a three-state molecular switch in contrast to the famous 2 state model of Monod is presented on pp. 583–610.

A number of articles deal with membrane structure and ion transport processes. Recent advances in the understanding of potassium, sodium and calcium channels are described by Yellen (pp. 227–246), Begenisich (pp. 247–264) and Tsien *et al* (pp. 265–290), respectively. A more general article on the structural organization in ion channels and energetics of transport is presented on pp. 205–226, NMR spectroscopic probes for detecting and estimating metal cations in different tissue compartments are explored on pp. 375–400. Chemistry of peptides that have an ability to interact with lipid bilayers is described in another article (pp. 561–582). Details of the structure and function of acetyl choline receptor (pp. 561–582) and the structure and assembly of coated vesicles (pp. 49–68) are other related articles.

Solution studies on the properties on enzymes often do not lead to correct prediction of metabolite concentrations in living cells as a result of the modulation of enzyme properties by their high concentration in living cells. An interesting account of the reaction sequences in such systems is analysed on pp. 174–204. The mathematical equations required for estimating thermodynamic efficiency of non-linear biochemical reactions are presented with reference to ATP utilization on pp. 401–422.

Use of polarized light, especially measurements of circular differential scattering, for obtaining structural information is covered by Tinoco *et al* (pp. 319–350). The distance geometry algorithm for deriving three-dimensional structure from 2D NMR techniques and their application to certain oligonucleotides is described on pp. 423–454.

A few articles cover specialized topics. These include a discussion on the limitation to sensation and perception as set by physical laws (pp. 455–478) and use of synchrotron radiation in clinical diagnosis (pp. 161–174).

The review has a leading article presenting conversation with Jeffeys Wyman on the historical developments in understanding the solution properties of biomolecules centering on haemoglobin. The article, apart from its scientific message, clearly

reflects the relationship between the social environment and development of good science.

The review is a welcome volume on a biophysicists' bookrack.

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Perspectives in Environmental Management, (ed.) T. N. Khoshoo (Published by Oxford and IBH Publishing Co. Pvt. Ltd., 66, Janpath, New Delhi 110 001), pp. 484, Price: Rs. 230.

This is a compilation of 33 addresses delivered at the 73rd Session of the Indian Science Congress held at Delhi in January 1986, the focal theme of the Session being 'Science and Technology in Environmental Management'. The subject is of topical global importance and it has been receiving increasing attention in India. The political leadership and the scientific community in the country have been evincing keen interest in solving some of the major environmental pollution problems of the country and the Science Congress Session has rightly devoted full-time to cover various aspects of the problem. The papers presented in this publication are from leading personalities from India, USA, UK, China, Switzerland, Philippines and Nepal. The Inaugural Address by Shri R. Venkataraman (now President of India) covers a wide range of historical developments in science and contributions by Indian scientists of international standing and also gives broad guidelines for the management of the environment. The paper by Dr T. N. Khoshoo is comprehensive in its coverage of the environmental problems and priorities in stabilizing human population, land use planning, water and air pollution, renewable energy sources, environmental education and legal actions required for conservation and management of the ecosystem.

The Section on 'Mathematical Sciences' carries two papers, one on mathematical modelling and the second on statistics in tackling problems of enviromental changes. The paper on physical sciences gives some new thoughts on lasers and their applications related to remote sensing as a tool in environment studies. The paper on chemical sciences gives a picture of the various metallic elements involved in environmental pollution and the mobility of the toxic metal ions in water and soil.

The Section on 'biological sciences' contains 10 papers, covering a wide range of subjects, such as soil environment, plant research, forest management, dynamics of disturbed ecosystems, watershed management in the Himalayas, cell biology, electropollution and tribal health environment. Each of the papers gives valuable information and data are well-presented.

The Section on health sciences contains 5 papers. Perspectives in urban health, nutrition, environment and human work performance, psychological dimensions of environmental management and certain problems of man under water are the major issues analysed and presented. The subjects covered, however, stand apart, and are not very much coherent to the basic theme of the publication.

The 5 papers under 'Energy and engineering sciences' give valuable data pertaining to energy resources, management and related environmental problems. The industrial aspects of energy utilization and technology transfer to rural areas are also covered.

The 'State of the environment' presents some valuable viewpoints on environment and its management in India, in contrast to other nations of the world, including China. Dr A. K. Biswas brings out lucidly the global economic-environment interdependence. The Congress Presidents' Concluding Report highlights the major issues and the recommendations of the Congress Session are elaborate covering the major branches of sciences. The Prime Minister in his address, while complementing the scientists for the good work done, has exhorted them to become 'equal to the best' in the world.

The publication is very valuable, carrying the thoughts of several leading scientists and impregnated with basic data on many aspects of natural resources, their utilization as also present and future aims and goals in environmental management. This book would benefit every scientist, irrespective of the branch he belongs to. The editor and publishers deserve rich compliments for bringing out this valuable volume.

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Environmental Biology by K. C. Agarwal. (Published by Agro Botanical Publishers (India), Old Ginnani, Bikaner 334 001), 1987, pp. 439, Hard bound, Price: Rs. 300 - or US $ 40.

The book is designed to provide outlines of Environmental Biology beginning from definitions of ecology and ecosystem and continuing to give insight into natural resources, environmental problems, protection, education, pollution and legal implications. It also lists environmental organizations, agencies and programmes. A glossary helps the reader to get to know the meaning of technical terms commonly used by environmental scientists. However, a subject matter index is lacking.

In the introductory chapter, at the end of page 3, the author writes that the subject matter treatment ought to include knowledge of environment in relation to geography, climatology, pedalogy, microbiology, biochemistry, physiology, biophysics biometry, sociology, economics, etc. but scarcely refers to all of them except the subject matter related to plant physiology (pp. 103–121).

The first chapter on ecosystem is brief but aptly describes the whole gamut of smaller ecosystems of the biosphere, the interconnecting food chains and cycles of elements. In the second chapter on productivity, the author has written more about plant physiological methods to assess productivity and less about productivity as such, in quantitative terms. The third chapter relates to the system analysis and ecosystem modelling in which the author has described different modelling techniques pointing out the attendent limitations in relying on modelling for situations where data are lacking. The fourth chapter deals with conservation and management of natural resources, both renewable as well as non-renewable. This chapter is devoted at length to Indian Forest Wealth and outlines the ways to prevent deforestation with information relevant to the Indian scene, more particularly about 'Taungya system' and 'Chipko movement'. The photographs on chipco movement on page 153, however, have been reproduced so poorly that one can hardly make out anything from them. In this chapter, agriculture and fisheries receive less attention when compared to forestry and wild life. The photographs of Great Indian Bustard, Serpent Eagle, Asian Elephants and Indian Wild Ass which have been poorly reproduced could have been easily omitted from the book. Tabulated information on national parks and wild life sanctuaries in India is quite useful to readers. Details of reactors in Atomic Energy Establishments in India together with World inventory of power reactors and the possibility of exploiting solar energy for man's ever increasing needs get more emphasis than other forms of energy such as wind and hydro-power. The fifth chapter is concerned with pollution and pollutants which includes acid rain bringing in sulphuric and nitric acids to pollute the environment. The chapter also describes the methods for overcoming pollution. This chapter is perhaps very exhaustive in covering all aspects of pollution and should be particularly useful to environmentalists. However, the figures depicting domestic and industrial waste (page 278) and the photograph of an automobile graveyard (page 279) are very pathetic in reproduction and mars the otherwise good coverage on the subject. This is true of the figure on page 302 which shows debris of skulls on which vulchers hover around. The fifth chapter deals with environmental education (for which this book is particularly designed) and outlines some approaches to educate people about problems of environment. The last chapter deals with the control of environmental pollution through law. After the references and glossary, a write up on Salim Ali the renowned Indian Ornithologist is given in the end. It is not clear why this person has been singled out for biographical description.

There are many spelling mistakes but the text runs smoothly. Despite this limitation, the book is informative on environmental science and will be useful to students and teachers alike. The book is expensive to buy especially by students and only libraries can afford the book.

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