
BOOK REVIEWS

Annual Review of Biophysics and Bioengineering by Lorin J. Mullins, (Annual Reviews Inc, 4139, El Caminoway, Palo Alto, California 94306, USA) 1983, Vol. 12, pp. 520, Price: USA \$47/- Elsewhere \$50/-

As in the previous, volume 12 of the Annual Review of Biophysics and Bioengineering contains a number of review articles dealing with newer developments in the continuously growing discipline of biophysics and bioengineering.

The importance of dynamics of proteins and nucleic acids and their interactions are well brought out. It is clear from the article on dynamics of t-RNA that the static picture of the 3-dimensional structure has to be replaced by a dynamic one that takes into account the functional relationships. In the article on protein-nucleic acids, interaction studies on the structure on the Cro repressor protein from bacteriophage λ , the cI or λ repressor protein and the catabolite gene activator protein from *E. coli* which binds specifically to sites on double stranded DNA are discussed and they have thrown new light on many important aspects of DNA-protein recognition, and positive and negative regulation of gene expression. The importance of thermodynamic parameters of protein-protein, protein-nucleic acid, protein-metal, protein-water and non-aqueous solvents for a thorough understanding of the energetic and structural properties of the system is well brought out in the review on protein ligand interactions. The various types of interactions that contribute to the stabilization of the native conformation of a protein and the various statistical mechanical models in which conformational fluctuations play an important role in depicting the dynamic process of the folding-unfolding mechanism of proteins are lucidly described in the article on protein folding.

This volume also contains a few important articles on newer applications of biophysical techniques to biologically important molecules. For example, the article on Time resolved x-ray diffraction studies on vertebrate striated muscle, helps to elucidate the molecular mechanism involved in muscular contraction. The article on the advantages in methods and applications of neutron protein crystallography, with emphasis on the developments of instrumentation and methodology has opened up new vistas in the structure determination of macromolecules. The application of NMR technique to studying metabolism *in vivo*, in

particular, the measurement of intracellular pH, reaction in the steady state, measurement of intracellular free Mg^{2+} etc is well brought out in the review on whole organ metabolism by NMR. The other interesting newer methods discussed are small angle neutron scattering studies of solution of macromolecules and Resonance Raman Scattering studies of the quaternary structure transition in haemoglobin.

Studies on the transmembrane ion-transport and the intracellular ion activities are subjects of a large number of investigations in recent times and this volume contains some important articles in this field, namely on intracellular measurement of ion activities, calcium transport and regulation in nerve fibres, sodium channel gating, acetylcholine receptor-controlled ion translocation and coupling of proton flux to the hydrolysis and synthesis of ATP.

The article on protein and nucleic acid sequence database systems is extremely valuable for research in many fields such as genetics, biology, biochemistry, medicine, pharmacology and agriculture as well as biotechnology and bioengineering. The mathematical analysis of the problems of immunological interest discussed in this volume is highly useful for researchers in the field of immunology. The interaction of water with nonpolar solutes is an intriguing problem and in the first article in this volume the authors have shown the unusual thermodynamic behaviour of aqueous solution of nonpolar substances.

Overall, Vol. 12 of the Annual Review of Biophysics and Bioengineering will be a highly useful series volume for all researchers working in different fields of biophysical and biological research.

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A plan for IRRI's Third Decade (International Rice Research Institute, Los Banos, Laguna Philippines, P.O. Box 933, Manila, Philippines) 1982, pp. 70, Price not given.

Estimates of population growth in Asia in the next decade suggest that although the overall rate of

increase may fall, it is likely to remain well above 2% per annum. The Food and Agriculture Organization (FAO) and the Trilateral Commission estimates that rice production will need to be increased by more than 3% per year until the end of the century. This extra requirement must be obtained largely as an additional yield/ha or from more crops grown per year as the new land available for rice production in most Asian countries is limited. In the past two decades the IRRI has developed rice varieties that have brought out a production revolution in rice in many countries. Modern rice varieties emanating from IRRI covered 9.5 million hectares in 1970 and spread to 30 million hectares in 10 major rice growing countries of south and southeast Asia by 1979. These modern rice varieties now provide 37% of all rice grown in these countries.

IRRI proposes a three-pronged strategy to increase and stabilize rice production during the 1980s.

1. Consolidate and expand the gains in production and productivity already achieved in irrigated areas and to raise the yield ceiling through the utilization of hybrid vigour and other approaches to bridge the gap between potential and actual yields.
2. Expand the frontiers of adaptation of high yielding technology by developing improved varieties and technology for different growing conditions ranging from moisture stress (rainfed upland) to moisture excess (deep water rice).
3. To develop suitable varieties and technologies for improving the production capacity of adverse soils; those that exhibit salinity, alkalinity, strong acidity, iron toxicity and excess organic matter. More than 80 million hectares in South Asia are affected by such problems.

Rice technologies to be developed for different areas would be site-specific and efforts will be made for increasing energy efficiency resulting in increased yield and income per unit of land, water, energy, time and labour.

IRRI plans to develop machinery for transplanting, fertilizer placement and grain drying of rice. It is felt that the impact of farm mechanization on employment of unskilled workers, particularly women, will have to be monitored. Diversification of labour use, not displacement of labour, will have to be the aim. IRRI planners feel that in the 1980s, famine of work may become more important than the scarcity of food in countries that have already made substantial progress in food production. IRRI proposes to intensify its work on cropping systems and in collaboration with National Research organizations, expand its studies on

farming systems as a whole.

A major contribution of IRRI towards increasing the capabilities of national rice research programmes is in training researchers and educators concerned with the production of rice and related crops. This effort of IRRI will continue in collaboration with the national institutions.

IRRI will also continue to play its important role in conservation of rice genetic resources.

The publication 'A Plan for IRRI's Third Decade' clearly shows that IRRI has a well thought out program for the third decade. The publication is strongly recommended to research and development institutions engaged in making their future plans.

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Proceedings of The Seminar on Management of Environment by B. Patel, (Health Physics Division, Bhabha Atomic Research Centre, Bombay 400 085) 1980, pp. 409, Price Not mentioned.

This compilation has thirty nine papers on aspects of Terrestrial Ecology, Human settlements, Atmospheric Environment, Aquatic Environment and waste management, and Techniques with two key note address papers on 'Science & conservation' and 'Man vs. Environment; Fact or Fancy' by D. J. Crisp, FRS and D. J. Jussawala respectively.

The address by D. J. Crisp focusses on the vital role of value judgements and scientific knowledge in the management of environment. Mr. Jussawala emphasises the need for a comprehensive act for environmental impact survey for any project to be made mandatory.

The article by Dr E. A. V. Prasad brings out a very interesting fact of the use of the Termite Mounds as hydrologic indicators referred to in *Brihat Samhita* of Varaha mitra (A.D. 505-587). Discussing the Agro-Forestry aspect, Sri G. S. Ranganathan argues that not withstanding all efforts, unemployment would be India's main problem for a long time. The article on 'Baseline Radiation Surveys in the Kalpakkam Environment' by Dr M. A. R. Iyengar *et al* points to the fact that the fishermen are liable to be affected by a much higher exposure than the farmers. Drs. Kalamegham and Krishnaswamy in their article on

'Nutritional Status Technical carcinogenesis' offer evidence to indicate that the diet may in one way or other be related to carcinogenesis.

Noise pollution so far is not at all seriously viewed in our country as a serious health hazard. The article by T. N. Mahadevan and R. K. Kapoor presents the noise levels in Bombay in residential localities, railway stations and trains. At 83 and 82 decibels recorded on a moving passenger train, deafness may be most common among the residents of Bombay as most of them have to commute day and night! It is well nigh impossible to compress in the short space of 300 words, 409 pages of subject matter. There are quite a number of very interesting articles which deal with the techniques of waste management, use of Bio-mass, Solar Energy and Monitoring of heavy metals in the environment.

Bringing together in one reference volume, valid and authentic information on such varied parameters of the environment is a laudable attempt.

It has to be stated however, reviewing this book was an exercise in 'Acute vision' with such a micro type print!

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Field Problems of Tropical Rice (revised edition) (The International Rice Research Institute, P.O. Box No. 933, Manila, Phillippines), 1983, pp. 172, Price not given.

Correct identification of field problems go a long-way in taking timely, speedy and effective corrective measures. The field problems of tropical rice are many. The first edition of Field Problems of Tropical Rice was published in 1970. In past one and half decades many more rice problems have surfaced in different parts of the world. The revised edition has included many of these newer field problems. As such instead of 93 problems dealt with in the first edition the revised edition contains 169 field problems.

Rice nematodes and weeds found in rice fields are the new additions to the revised manual. Newer pest problems like smaller brown planthopper, rice delphacid, green semilopper, short-horned grass hopper,

mealybugs, burds etc diseases like Foot rot, stripe, leaf scald, Bakanae, gall dwarf, grassy stunt, Hoja blanca, yellow mottle etc have been added in the revised edition which gives a fuller treatment to the field problems of tropical rice.

The high standard clear pictures focussing the problem and its identification, symptoms and non-technical text makes it a highly useful manual for field workers. The format of the revised edition is such that it permits translation and already the first edition of the manual has been published in 11 languages other than English. The publishers of the manual encourage its translation in other languages and its copublication without charging any royalties. These arrangements make the manual more and more useful to different parts of the world and different states of this country where a large number of languages are spoken and understood. Translation of the revised edition also in several Indian languages spoken in rice growing tracts of India will be highly beneficial to extension workers and progressive farmers.

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Newer Concepts in Nutrition and their Implications for Policy 1982 by P. V. Sukhatme, (published by Maharashtra Association for the cultivation of Science Research Institute, Pune 411 014) pp. 269; Price: Rs. 40/-.

This edited volume is a collection of papers by eminent scientists from various disciplines such as Statistics, Economics, Biochemistry and public health and is aimed at focussing the attention of planners, on the newer concepts in nutrition that have a direct bearing on the policy decisions for improving the living conditions of the masses particularly from the developing countries.

The book is divided mainly into six sections. Section I presents four papers on an overall view of the nature and dimensions of the nutrition and poverty problem based on the newer concepts. In the first paper, Sukhatme emphasizes the dynamic nature of man's requirement for energy and reviews its implications for the measurement of poverty linked with malnutrition. In two additional papers on 'Models for protein and energy deficiency' Sukhatme and Margen illustrate how auto-regulatory mechanism works and a third

paper on 'Genetic components in man and environment' by Prof. Prem Narain shows how environment reacts with genetic entities to make intra-individual variance a fundamental source of variation. Section II includes two papers by Prof. David Seckler which elaborate on the concept of 'small but healthy' and explain the implications of the auto-regulatory mechanism for body growth and work output. It also includes a paper by Dr Ashok Desai on the wage efficiency mechanism and nutrition theory. Dr Desai does not find any evidence that relationship between food intake and work output plays a major part in the determination of agricultural wages in the country.

Section III includes two papers by Prof. Lincoln Chen. These provide altogether new dimensions to the self-regulatory mechanism in terms of ecology. In particular, Chen's papers show that it makes little difference whether body weight is lighter or heavier than the American median standard down to about 35%, so far, as susceptibility to the childhood diseases is concerned, and that in consequence, the Gomez classification of mild and moderate malnutrition appears to have little meaning. Section IV includes contributions from Prof. Deodhar and Dr Antia and shows how nutrition is medicalised by undue emphasis on vitamins, iron and food processing to the neglect of hygiene, sanitation and water supply. To provide the latter is not costly, provided we work within the framework of traditional culture to avoid contaminating water by fencing the village well and inculcating among school children, the habit of personal hygiene and use of community latrines which may be connected to gohar gas plants.

Section V includes two papers by Prof. Soman

dealing with the Kerala experience. Kerala, as is well known, has the lowest infant mortality in India and the longest expectation of life. The death rate is lower than in several developed countries. The paper shows how with the intake as low as 1300 to 1400 calories, women in Kerala have a level of health and activity on par with other women eating much more and illustrates how food is used with greater efficiency at the lower end of the homeostatic range. The second paper on the evaluation of nutrition programs shows how school meal program in operation all over the state, in over 8000 schools has utterly failed to bring any increase in the weight and height of children.

Section VI includes a paper on the 'Philosophy of Indira Community Kitchen' which shows that poor can help themselves to be self-reliant and altruistic at the same time and shows the way of combating poverty. This paper was specially prepared for the workshop organized for senior administrators of north-eastern states at the instance of the Planning Commission which has recommended in its Sixth Five Year Plan, the model of the Indira Community Kitchen for adoption by the states. The community kitchen at Pune serves around 15,000 meals a day at half the market price.

This book is worth its place in any library in India or abroad.

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NEWS

FIREPROOF PLASTIC FOR AIRPLANES AND POLICE ?

'Airline passengers and riot police may feel a little safer if the plastics industry takes to a new polymer called POP, its maker, Bayer, says the material is 'virtually non-combustible'. POP, or polyphosphate, is chemically related to polycarbonate. It will burn only in gas mixtures that contain more than 70% oxygen, Bayer says. Air contains 21% oxygen. The

mass-produced polymer will be clear enough to make windcreens, riot shields and goggles. The manufacturer is looking to the aircraft industry for bulk sales. So far, the polymer is available only in experimental quantities, in a brown colour. Firms can process POP in much the same way as polycarbonates'. (*New Scientist*, 100 (1383), 419, November '83).