REVIEWS

Annual Review of Biophysics and Bio-Engineering, Vol. 9. Jointly written by L. J. Mullins, William A. Hagins, Carton Newton and Gregoria Weber. (Annual Reviews Inc., 4139 El Camino Way, Palo Alto, California 94306), 1980. Pp. 643. Price $ 20.00.

The Volume 9 of the *Annual Review of the Biophysics and Bioengineering* contains a variety of new topics in areas where rapid progress has been made. The present volume is useful to research workers in the fields of biology and bioengineering. There are a number of review articles that not only deal with new techniques and new applications but also with existing techniques applied to biological molecules.

In the first article, Luzzati and Tardieu discuss the main novelties in solution X-ray scattering studies, both by experiment and by theory. Although the strategy for structure analysis is discussed in terms of an example—low density serum lipoprotein—the article opens the way to some of the most promising areas in solution X-ray scattering studies, namely, membranes, ribosomal subunits, chromatin particles, etc., which are not yet amenable to crystallization. In the article on photoacoustic spectroscopy, Rosencwaig describes the principles, experimental methodology and application of this relatively newer optical technique, to study the materials that are unsuitable for the conventional transmission or reflection methodologies. The author has reviewed some of the recent experiments with the photoacoustic effect, in the fields of biology and medicine, indicating some of the most promising applications of this technique to biophysics and bioengineering.

Sutherland and Holmquist, in their article on Magnetic Circular Dichroism (MCD) of biological molecules, have summarised the theory of MCD from the point of view of practical applications to biochemical problems, the available instrumentation and the literature survey on the use of MCD, for understanding the structure and function, of major classes of biological molecules, such as proteins, nucleic acids, etc. There are several exciting new applications of NMR spectroscopy in the study of biological systems. Villafranca and Raushel in their review article highlight two areas of NMR research that are mainly concerned with elucidation of the mechanism of enzyme action, namely, the study of metal nucleic in metalloenzymes and the effect of the isotope shift of ^{18}O on the ^{31}NMR spectra of phosphorus containing compounds. The review illustrates the prospect of studying many metal ion nuclei in interesting biochemical systems. A few other techniques described in the book are Radioimmunoassay (RIA) by Yalow and special techniques for the automatic computer reconstruction of neuronal structures by Sobel, Levinthal and Macagno. RIA is used in several laboratories, in routine diagnostic procedures, to measure concentrations in blood, tissues, drugs, enzymes, viruses, bacterial antigen, etc., and the present article emphasises certain aspects of physics and mathematics of RIA. The article on special techniques for the automatic computer reconstruction of neuronal structures deals essentially with automation of the data, input phase of the techniques, for computer aided reconstruction of tracing of serial section (CARTOS) which is essential for understanding the neural mechanism of behaviour and nervous system development.

In addition, there are a number of general articles dealing with some of the recent developments in the field of biology. For example the article on X-ray diffraction studies of the heart by Matsubara deals with the studies on mammalian heart muscle; this could lead to information on molecular packing of Myosin and actin in the myofilaments and comparison with the skeletal muscle. The review on the optical activity of nucleic acids and their aggregates by Tinoco, Bustamante and Maestre includes experimental and theoretical work particularly on the CD of DNA in complexes and aggregates. There is also a very interesting and useful article on the current state of transfer of RNA in solution, by Schimmel and Redfield. The review on the nerve growth factor protein by Vinores and Guroff discusses structural similarity of this protein to insulin and the molecular mechanism by which it affects its target cells.

The two articles related to cell membranes, one on comparative properties and methods of preparation of lipid vesicles (liposomes) by Szoka and Papahadjopoulos and the other on the structure of proteins involved in the active membrane transport by Hobbs and Albers will be extremely useful to research workers in this area. In the article on liposomes the authors have summarised varied preparation and utilization of liposomes for studying biophysical and biochemical phenomena related to cell membranes.

In addition, there are useful topics such as "Stimulus response coupling in gland cells" by Ginsborg and

House, dealing with electro-physiological studies of secreting cells, "Modulation of impulse conduction along the axonal tree" by Swadlow, Kocsis and Waxman dealing with the review of the static characteristics of axons, "Machine-assisted pattern classification in medicine and biology" by Li and Fu dealing with the computer aided pattern classification of a set of physiological measurements and of medical images, "Certain slow synaptic responses, their properties and possible underlying mechanisms" by Kehoe and Marty; "Display and analysis of flow cytometric data" by Gray and Dean illustrating computer techniques for data display, non-parametric and parametric analysis; and "Biomathematics in oncology, modelling of cellular systems" by Newton describing the role of biomathematics in cancer research and treatment. The book ends with the review article on "Medical information systems" by Laska and Abbey where the authors have discussed the computer applications in medicine and the development of clinical decision support systems, its pros and cons.

Overall, Vol. 9 of the *Annual Review of Biophysics and Bioengineering* contains new topics which, though varied in content and unrelated, is very ueful for a researcher in the particular fields of interest.

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Radioactive Waste Management and Disposal. Edited by R. Simon and S. Orlowski. (Harwood Academic Publishers, P.O. Box 786, Cooper Station, New York 10003), 1980. Price : $ 82.00.

The publication is essentially the proceedings of the First European Community Conference on "Radioactive Waste Management and Disposal" held at Luxembourg from May 20–23, 1980. The conference was organised by the Commission of European Communities (CEC) and was attended by representatives of the nine member countries and also scientists from outside the community.

The subject of the symposium is very topical. In the member countries of the CEC as well as in other countries the relevance of nuclear power is being increasingly questioned. Its acceptance is tied to finding and demonstrating a viable solution for the back end of the nuclear fuel cycle, in particular for conditioning of high level and alpha-bearing wastes and their disposal. The main emphasis of the conference was on evaluation of the status of technology and on-going research in this field. The topics covered by the conference include, treatment in conditioning technology of medium to high radioactive wastes as well as alpha-contaminated wastes, techniques of evaluation of conditioned waste products, their interim storage and final disposal in salt, granite or clay geological formations in deep underground sites. The other topics such as the problem of handling, conditioning and storage of gaseous wastes, the fuel cladding hulls, etc., have also been touched on. Perhaps the most important contribution from the conference is the recognition of the scientists, that emphasis needs to be put on overall safety analysis of the disposal concept. A systems approach towards the safety analysis and its assessment is essential to ensure that the movement of radionuclide from the waste package to the biosphere, even in the far future, can be kept down to levels, where it would pose no hazard to man and his environment.

The papers presented are of high quality and the final discussions bring out very clearly the concern of the scientists working in this field, to put forth an objective assessment of the problem.

The publication would be of immense interest and value not only to scientists working in the field of radioactive waste management, but also to others who are interested in appraising themselves of the status of technology in this field,

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