REVIEWS AND NOTICES OF BOOKS

Modern Microscopy—Elementary Theory and Practice. By C. F. A. Culling. (Butterworths and Co., Ltd., 88, Kingsway, London, WC 2 B 6 AB), 1974. Pp. xii + 148. Price £ 1.50.

This book on *Modern Microscopy* by C. A. F. Culling (Butterworth and Co., Publishers Ltd., 1974) deals with theoretical principles and practical aspects of a wide range of microscopes.

There are, in addition to the introduction, 12 chapters. The first chapter exclusively deals with the various optical and mechanical aspects of a compound microscope, the illumination, setting up the microscope, and finally the micrometry. An additional feature of this chapter is the treatment of lenses and their aberrations which is an asset to every microscopist. In the second chapter the author briefly describes and recommends the use of the comparison microscope for comparing by direct observation of the two specimens instead of relying on human memory for this comparison. The brief third and fourth chapters deal respectively with the low-power dissecting microscope and the dark-ground microscope. The next two chapters, namely the fifth and sixth, introduce the concepts of fluorescence and discuss the fluorescent microscope techniques. Autofluorescence, fluorescent staining and fluorescent antibody techniques are treated rather elaborately. In the seventh chapter the author treats some aspects of polarisation as needed for the use of a polarising microscope. The next chapter deals with the phase contrast microscope. In chapters nine and ten the interference contrast microscope (Nomarsky) and the interference microscope are well presented. Brief and succinct in the presentation, these two chapters deliver the necessary information on the fundamental principles, setting up and using the microscopes.

While dealing with photomicrography in chapter eleven, the author has considered at length on some essential prerequisites for good image such as elimination of vibration, use of camera with and without lens, light sources, magnification and resolution and use of colour filters to obtain contrast. Electron microscopy forms the subject-matter of the last chapter. A brief theory and construction of an electron microscope is followed by details on the techniques of preparation of tissue sections for examination with the microscope. Staining methods and preparation of electron microscope grids are also included.

This booklet is an asset to the libraries and students. Elementary theory and principles involved in each microscope, methods of preparing materials, and staining techniques have been presented in a lucid and detailed manner. As the author claims, this book truly meets the needs of students and research workers alike. The book is recommended to students of biology, chemistry, physics, pathology, and laboratory technologists.

M. R. RAO.

Annual Review of Biophysics and Bioengineering (Vol. 3). Edited by L. J. Mullins, William A. Hagins, Lubert Stryer and Carol Newton. (Annual Reviews, Inc., 4139 El Camino Way, Palo Alto, California 94306), 1974. Pp. 401. Price: U.S.A. $ 12.00; Foreign $ 12.50.

The volume contains a number of reviews on various different branches of biophysics and bioengineering, and the scope of the volume is best illustrated by giving the titles of the different articles, which are the following: Kinetics of allosteric Enzymes; Some Applications of Calorimetry in Biochemistry and Biology; Structure of Photoreceptor Membranes; Protein Model Refinement Based on X-Ray Data; The Properties of Water in Biological Systems; Conformational Changes in DNA Molecules; The Structure and Spectra of the Chromophore of the Visual Pigments; Rotational and Translational Diffusion in Membranes; Thermodynamic Relationships in Mitochondrial Oxidative Phosphorylation; Collagen as a Biomaterial; Automata and Biology; The Analysis of Convection and Diffusion in Capillary Beds; Freezing Injury and its Prevention in Living Cells; and Scientillation Scanning of the Brain. The two articles of special interest to the reviewer were the one by L. H. Jensen on protein structural refinement and the one by Stenzel, Miyata and Albert L. Rubin on collagen as a biomaterial.

Jensen's article describes the refinement of the crystal structures of a number of proteins using X-ray data and standard techniques of Fourier and least-squares refinement. It is interesting to note that in the case of Rubredoxin, the R-value came down from nearly 0·4 to 0·126. As a result, several of the side-group atoms came out very prominently and could be readily located. However, in the case of cytochrome c, the protein molecule itself did not refine, but only the solvent

molecules could be located. The method is, therefore, of great value in small proteins and has still to be worked out in the case of larger protein molecules.

The chapter on collagen as a biomaterial starts with the biochemical and biophysical properties of collagen, in which the primary structure, cross links and the action of collagenase on collagen are treated. This is followed by an account of the biological properties of collagen and the clinical applications of various types of collagenase material such as collagen heterografts, reconstituted collagen, extruded collagen fibres, collagen membranes and films, and collagen gels and sponges. The article is brief, but contains a valuable collection of information to the bioengineer for using collagen for "eye surgery, skin and bone replacement, blood vessel and heart valve implantation, dialysis and drug delivery and possibly result in the restructuring of normal tissues".

The volume as a whole is highly informative and useful, and is strongly recommended to every biological library. G. N. RAMACHANDRAN.

The Red Shift Controversy. By George B. Field, Halton Arp and John R. Bahcall. (W. A. Benjamin Inc., Advanced Book Programme, Reading, Massachusetts, U.S.A.), 1973. Pp. xvi + 324. Cloth $ 19.50; Paper $ 11.00.

The Frontiers in Physics Series concerns itself with the problem of communicating in a coherent fashion the recent exciting developments in the active new fields of physics. In this task, the present book has succeeded admirably. It presents a quick survey of the problems raised by the large Doppler shifts and the large apparent luminosities of quasi stellar objects (quasars) and their cosmological implications.

Since Hubble's observation in 1929 of a linear relationship between the distance of a far-off galaxy and the Doppler red shift interpreted as a velocity of recession from us, the model of an expanding universe has been firmly accepted with the Hubble's law as the observational evidence. The discovery of quasars in the early sixtees has thrown up a problem. If their large red shifts are interpreted to mean that they are at very great distances, then their high apparent luminosity implies an unusually large intrinsic luminosity and energy content for the quasar. On the other hand if an acceptably large intrinsic luminosity is assumed and the apparent luminosity used to infer the distance of the quasar from us, then there is a breakdown of the Hubble's law. This present debate in the field of cosmological studies is summarized in the book, with Dr. Arp stating the case for the breakdown of the Hubble's law for the quasars, Dr. Bahcall stating the case for the unusual luminosity of the quasars and Dr. Field acting as the moderator.

The book is based on the discussion held at the American Association for Advancement of Science in December 1972. The book has been released in May 1974. Apart from the survey articles of Arp and Bahcall, the book includes reprints of about 30 significant papers published on the subject. Inevitably newer observations will render any book out of date, particularly a book of this type. However there is no doubt that, like another astronomical phenomenon namely the meteor, the book will illumine the field for a while and fade away from view afterwards, having fulfilled its destined role. P. S. NARAYANAN.

ANNOUNCEMENTS

Award of Research Degrees

Utkal University, Bhubaneswar, has awarded the Ph.D. degree in Mathematics to Shri Umakanta Mohapatra for his thesis entitled "Flow and Heat Transfer in Visco-elastic Liquids".

The M.S. University of Baroda has awarded the Ph.D. degree in Biochemistry to Shri Shashikant Jagannath Tarwadi for his thesis entitled "Studies on Algal Bacterial Symbiosis in High Rate Oxidation Ponds using *Oscillatoria* Spp."; Ph.D. degree in Biochemistry to Shri Chandrakant Mohanlal Upadhyay for his thesis entitled "Effects of Dietary Variations on Bone Composition in Rats"; Ph.D. degree in Psychology to Shri Prasant Kumar Gangopadhyay for his thesis entitled "Social Intelligence and Its Relationship with Abstract and Mechanical Intelligence".

Books Received

Radiometric Methods of Exploration. By V. L. S. Bhimasankaram. (Centre of Exploration Geophysics, Osmania University, Hyderabad 500 007), 1974. Pp. xvi + 212. Price Rs. 20·00; $ 4.00 (postage extra).

Indian Journal of Earth Sciences (Vol. 1, No. 1). (Indian Society of Earth Sciences, Department of Geology, Presidency College, Calcutta 700012), 1974. Pp. ix + 130. Price: Annual Subscription: India, Rs. 40·00; U.S., $ 10.00; £ 4.00; Personal Subscription in India: Rs. 20·00

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