

BOOK REVIEWS

Annual Review of Medicine: Selected Topics in the Clinical-Sciences (Vol. 32). Edited by William P. Creger; C. H. Coggins; Associate Editor; E. W. Hancock, (Annual Review Inc., 4139 El Camino Way, Palo Alto, California 94306), 1981. Pages: 6-24, Price: \$20/-, Outside USA \$10/-

This volume is brought out in continuity with earlier volumes and maintains the same high standard as before. The book contains 43 titles carrying 624 pages, many useful illustrations, graphs and figures. The volume rightly deals with new thoughts and approaches to varied topics in medicine.

The book begins with the title "Serological markers of hepatitis B virus infection" by J. H. Hoofnagle, highlighting the numerous and complex serologic markers associated with type B hepatitis. The volume also lucidly tackles such interesting topics like immune complexes, genetic component of alcoholism, sickle cell anaemia, panic attacks and phobias. The current topics in cardiovascular mortality, prognosis in bundle branch block and cardio-pulmonary resuscitation make useful and interesting reading.

The topic on renal calcium handling is fascinating. Every internist should read the discussion on coronary risk factors in the young. B. E. Murray and R. C. Moellering have elaborately dealt cephalosporins and cephalosporins like antibiotics. The title male erectile disorders is sure to broaden the knowledge of every clinician about this common clinical problem. The topic on magnesium deficiency and excess by R. K. Rude and F. R. Singer rightly highlights the importance of this prominent metal in health and disease. The chapter on convulsive and drug therapy of depression is comprehensive and practical. The book ends with a befitting chapter on pediatric atherosclerosis.

Every topic in the volume is lucid, up-to-date and highly informative. The Annual Review of Medicine 1981 will be an excellent volume both for the research worker and the clinician. The book is a highly commendable piece of work in selected topics on clinical science.

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As in the previous volumes, the Annual Review of Biophysics and Bioengineering, Vol. 10, contains review articles on new biophysical findings and applications on varied topics in biological research. The articles on "Enzymes under extremes of physical conditions" and "Protein-solvent interactions" stress the importance of the influence of various solvent properties on the protein structure and function discussed in terms of the intra- and intermolecular forces stabilizing the native state of enzyme molecules. Though advances have been made in the experimental analysis and theoretical predictions of the conformational stability of peptides and proteins, these articles emphasize the importance of the influence of solvent properties and solvent-solute interaction in the stability of proteins and peptides. These articles in a broad sense are also concerned with the question of life in extreme environments.

The article on "The interaction of intercalating drugs with nucleic acids" is excellent illustrating the changes in the properties of DNA when intercalating drugs bind to it. The close association of basic research on DNA and application to synthesize new drugs is well brought out. The article on "Psoralen photochemistry" deal with their chemistry, reactions and kinetics with DNA and RNA. The reviews, "Viroid structure" and "Rhodopsin and bacteriorhodopsin" deal with the latest developments in the respective fields.

The chapter on "Use of immobilised cells" gives some novel approaches of utilizing enzyme for commercial purposes important to chemical analysis, food industry, medicine and energy generation. Immobilization of microbial cells and its applications are discussed and recent trends and developments are reviewed. This article draws our attention to the growth of biology as an important element in modern technology.

There are a few articles in this volume, which deal with membranes, such as membrane potentials, interacting phospholipid bilayer, nerve sodium channel incorporation in vesicles, etc. This volume also contains articles on newer techniques and their applications to biological research. For example, the article on low temperature electron microscopy discusses essentially the improved methods of preparations and observing specimens at liquid helium temperature (cryo-stabilisation). The ultrafast freezing of samples which open up the possibility of studying a whole range of structure-function relationship in cell biology is well discussed. The review on "¹³C NMR in metabolic process" is another example of the newer application of the ¹³C NMR spectroscopy to biological systems. In the "Nucleotide conformational analysis by ³¹P NMR", the authors

Annual Review of Biophysics and Bioengineering. Volume 10. (1981) Eds. L. J. Mullis, Willia Hagins, Carol Newton, Gregori-O-Weber. Published by Annual Review Inc., 4139, El Calmino Way, Palo Alto, California 94306, USA. Pages: 629, Price: \$ 21.00.

discuss the use of ^{31}P NMR as a conformational probe of nucleic acid, nucleic acid-drug and nucleic acid-protein complex with emphasis on the structure and environmental factors that influence these shifts. Other techniques and their applications to biochemistry and biology discussed in this volume are quasi-elastic light scattering and resonance X-ray scattering.

The last two articles of the present volume on 'Compartmental analysis' and "Image reconstruction by 3 dimensional electron microscopy" illustrate the application of theoretical tools to biological research. These two articles attract reader's attention to the reward of the advancement of basic knowledge to practical applications.

Overall, Vol. 10 of the Annual Review of Biophysics and Bioengineering will be extremely useful to researchers in the different fields of biological research, aspiring to know and learn newer and modern methodologies.

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Annual Review of Nuclear and Particle Science vol. 30, 1980 edited by J. D. Jackson *et al.* and published by Annual Review Inc., 4139, El Camino Way, Palo Alto, California 94306, U.S.A. Pages: 604, Price: USA \$22.50 Elsewhere \$23.50.

This volume of the Annual Review of Nuclear and Particle Science maintains the tradition of presenting excellent reviews of important developments by outstanding scientists. In recent times, development in particle physics has been dominated by the discovery of charmed particles and the new lepton called Tau. The article by Perl on the Tau lepton lucidly explains the experimental discovery and determination of its various properties like mass, spin, the life time and the various decay modes as well as establishing that the associate neutrino is different from the muon. electron neutrinos. Similarly the article on charmed mesons by Goldhaber and Wiss gives a clear description of the properties of the D and D* meson and the evidence for the validity of the Glashow Iliopoulos Miani model for the weak interaction current of the charmed quark.

Study of large momentum transverse momentum hadronic processes (or what may be regarded as particle physics analog of the famous Rutherford experiment on α scattering) has yielded valuable information on the constituents of hadrons, as well as the interaction between them at short distances. The article by Darriulat gives a critical presentation of

experimental data and how the naive Parton model and perturbative QCD fare in describing them.

Experimentally identifying the end product of high energy collisions namely pions, kaons and protons is crucial. Measuring the energy loss of these particles when passing through matter can identify these in the momentum range $5 \leq P/\mu c \leq 300$. The article by Allison and Cobb lucidly explains the experimental method and the relevant theory.

The beautiful experiment at the Stanford Linear Accelerator Centre using polarized electron scattering provided a stringent test of neutral weak interaction theories. Commins and Bucksbaum review these as well as the various atomic physics experiments designed to measure parity violation.

To demand a description of collision of particles at energies beyond 10 TeV is a challenge to the imagination of theorists. The centuaro events are only one example. Gaisser and Yodh's article is a source of inspiration for both theorists and experimentalists who would like to venture into this terra incognita.

Quantum Electrodynamics is the only field theory for which reliable computational methods are known. Precise measurement of the properties of Positronium and their confrontation with QED is the subject of Berko and Pendelton's article.

Nuclei at high angular momentum (upto $38\hbar$!) is the subject of Diamond and Stephen's review. The article by McGroy and Wilden reviews the state of the art in large scale shell model calculations (matrices of dimension running to a few thousand!) in the sd shell as well in other mass regions.

How does one measure the moments of nuclear with lifetime of the order of 10^{-12} sec? Make the ion of the excited nuclear state travel through a ferromagnetic medium! Benczer-Koller, Hass and Sak describe how transient magnetic fields at ions transversing ferromagnetic media can be used to measure nuclear moments.

Ultrasensitive mass spectrometry with accelerators (which can measure isotope ratios less than 10^{-15} !) is the subject of the article by Litherland. Cahill reviews the application of particles induced x-ray emission and proton microprobes for an analytical study of a wide variety of problems in Archaeology, Atmospheric Sciences, Geology, Biology, Medicine etc.

The editors deserve to be warmly congratulated both on the choice of the subject matter and the reviewers. Considering the quality of the articles, the price is very reasonable.

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Experimental Pulse NMR—A Nuts and Bolts Approach. By E. Kukushima and S. B. W. Roeder (Addison-Wesley Publishing Company, Advanced Book Program, Reading, Massachusetts), 1981, pp. xiii + 539. Price: \$ 34.50

The advent of pulsed Fourier Transform Nuclear Magnetic Resonance (FTNMR) Spectroscopy has widened the scope of the technique enormously, particularly in the study of nuclei other than hydrogen-1. Whilst there are many scholarly expositions of the principles and applications of FT NMR, there is certainly a need for a book that explains the physical concepts underlying pulse NMR and the actual experimental methods in a simple language to the newcomers to the field. The book under review fulfills this task admirably. It can also serve as a "guide book and a handbook".

The first two chapters of the book deal with the basics and details of pulse and Fourier Transform NMR. The following chapters on "Relaxation" and "NMR of Solids" are particularly impressive. Many concepts such as "spin temperature", "cross-polarization" and "rotating frame relaxation" are explained clearly. The treatment of high-resolution NMR of solids reflects the most important developments in this emerging area. The last two chapters on "NMR Hardware" and "Practical Techniques" give a detailed description of what happens inside the spectrometer "box" and contains several useful suggestions for maintenance, trouble-shooting and modifications to the spectrometer to suit the needs of the individual research worker.

The lucid style adopted by the authors makes the book thoroughly enjoyable to read. The book is strongly recommended to all those interested in pulse NMR. Although it is not intended to be a text book, it can be used to supplement the standard textbooks for a Course on FT NMR spectroscopy.

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Reaction Engineering in Direct Coal Liquefaction by Yatish T. Shah (Addison-Wesley Publishing Co., Reading, Massachusetts, U.S.A.), 1981, Pages: 1312, Price: Rs. 80/-

The dwindling supply of petroleum and natural gas has accelerated research and development efforts for tapping alternate energy resources. An attractive proposition has been the liquefaction of coal to provide synthetic liquid fuel to supplement petroleum

reserves. The production of liquid fuels from coal has been a possibility since the beginning of this century and was in vogue in Germany during the second world war and it is ironic that in the closing decades of the century we have been forced to look back to coal as a source of liquid fuel. Direct and indirect coal liquefaction processes can convert coal to fuel oil, gasoline, gas and chemical feedstock. However, synthetic fuels made from coal are expensive. The high cost is primarily due to low thermal efficiencies and high capital cost. Direct coal liquefaction processes possess relatively higher thermal efficiencies than indirect coal liquefaction processes that first convert coal into a gas which on recombination provides liquid fuels. Many reaction engineering studies have been made in developed western countries, notably in U.S.A., to analyse the complicated process network and to suggest strategies for reducing capital costs and increasing process efficiency. Sufficient information based on laboratory and pilot plant studies have been accumulating over the past two decades. It is only natural that Professor Y. T. Shah at the University of Pittsburg who has pioneered research and development studies in direct coal liquefaction process, has succeeded in his painstaking efforts to present to the academics, the research and the development engineers, a state-of-the-art review of this strategy of paramount importance to our country.

The book begins with the presentation of a critical review of the two major processes that are in vogue, namely the solvent-refined-coal (SRC) process and the Exxon donor-solvent (EDS) process. In addition details of other extraction techniques notably Japan's sunshine process, (solvolyis) and the catalytic H-coal process of hydrocarbon research, have been mentioned. Coal liquefaction technology has been updated significantly during the past decade. With the use of hydrogen-donor solvent in coal-oil slurry and an improved catalytic reactor system, coal liquefaction processes can now be operated under less severe conditions of temperature and pressure to achieve greater efficiencies with less hydrogen consumption. The second and third chapters deal with the structure and properties of coal and the mechanism of coal liquefaction including removal of hetero atoms like sulphur, oxygen and nitrogen. From the point of view of interest to chemical engineers, chapters four and five deal with kinetic models for DS liquefaction processes and design of coal liquefaction reactors. An interesting laboratory development is the design of a differential reactor for measurement and correlation of conversion (to liquid fuel) data.

The chapter on kinetic models has very ably presented the assumptions and applications of various rate equations based on information gathered in a variety of experimental set-up, namely batch autoclave, macro and micro differential reactor, tubular reactor and laboratory scale CSTR and a novel design of Prof.

Shah, the segmented bed. Based on the extensive data available, some general conclusions regarding the effect of residence time (short or long), and temperature on conversion of coal have been presented. The Squires model has provided a conceptual mechanism for the solvent liquefaction of bituminous coal. The models of Weller, Cronanet, Morita *et al.* essentially deal with the reaction network consisting of series/parallel reactions. A simple free-radical mechanism of coal liquefaction has been proposed by Attar and the process can be viewed as proceeding by two parallel paths. Gun and several Indian investigators have proposed a sophisticated free-radical mechanistic scheme consisting of 13 reactions based on eight major types of reactions. The fifth chapter is concerned with the design considerations of preheater and reactor. Considering the uncertainty involved in the development of a plausible and qualitative kinetic scheme, the reactor design is based on simple sets of reaction pathways. In addition, pressure drop and heat-transfer considerations for the preheater and reactor have been evaluated. This chapter is by far the most useful from the point of view of practical aspect of the coal liquefaction schemes. The authors who have contributed to the model development and design are to be congratulated for having tackled a highly complicated problem in a competent way. It is all the more gratifying that many of these are Indians! It would be highly beneficial to the academic and professional communities in India if some of these outstanding scientists could be persuaded to spend some time with our National laboratories notably NCL and FRI so that their expertise could be utilized for deriving economic benefits to our society in the area of synthetic liquid fuels.

Taking an overall perspective, the book is an outstanding contribution in the general energy science and technology from the gifted author Prof. Y. T. Shah. This book is recommended for all departmental libraries in Institutions having flourishing departments of chemical engineering and fuel technology. For such of those individuals involved in process research and development in energy science with special reference to coal and lignite and who can afford the book, the expenditure would be quite worthwhile.

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the space telescope and the Einstein orbiting X-ray observatory. Of these four major astronomical facilities, the VLA and MMT have recently been commissioned, the Einstein observatory has already finished its useful life after opening the wide X-ray window in astronomy, and the space telescope, yet to be launched, represents optical astronomy's great hope for the future. The accounts of how these instruments were conceived and built are written by people who had key roles and include details of the decision-making, policy, funding and procedural matters which were involved in each project. While these make for very interesting reading and give information not readily available elsewhere, the reader looking for an account of the technical brilliance which went into these instruments as well as the astronomy they are expected to produce will have his appetite whetted but perhaps not entirely satisfied. On the other hand, anyone concerned with the process by which such large projects are executed will find a lot of thought provoking material. It comes as a revelation to learn how vital decisions concerning these projects had to be made under the pressure of limited time and money, personal differences and sometimes accidental circumstances. The final facade of a completed facility tells very little of what went into it and the authors are to be congratulated on their frankness in bringing out the stories of their projects with (all?) their vicissitudes.

Especially interesting is the discussion of future possibilities, both for large ground based optical telescopes and future orbiting X-ray telescopes. Reading such a book gives a feeling for the new astronomical concepts and possibilities which could be round the corner. Everyone working in the field will feel their impact, regardless of whether they use the new instruments themselves or not.

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Annual Review of Pharmacology and Toxicology.
Volume 21, 1981 Edited by Robert George; Published by Annual Reviews Inc., 4139, El Camino Way, Palo Alto, California 94306, USA. Pages: 670.

This book is of special interest to pharmacologists, biochemists, physicians and post-graduate medical students.

Reviews on presynaptic receptors, mechanism of action of barbiturates, radioimmunoassay, excitatory amino acid transmitters, nerve growth factor and its antibodies are very descriptive and lucid. The article on treatment of acute lymphatic leukaemia in childhood, gives an insight into the therapeutic

Telescopes for the 80's. Editors G. Burbidge and A. Hewitt (Annual Reviews Inc., Palo Alto, California U.S.A.) 1981 Pages: 278, Price: \$27 U.S.A., outside \$28.00

This book has four chapters devoted to the very large array (VLA) the multimirror telescope (MMT),

advances that have led to the great improvement in the survival rate. In the article 'Pathogenesis of lung cancer', the various experimental procedures relating to modification of host susceptibility are comprehensively dealt with.

Introduction of a new feature 'New Medications 1981' is an additional attraction to students, practitioners and faculty members.

The scope and depth of the presented material are such that it is difficult for one person to critique the specifics reviewed by various authors chosen for their expertise. This volume is one of the more useful books for pharmacologists, biochemists and physicians.

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SURENDRA REDDY

ERRATUM

Paper entitled 'SOME MESOZOIC PLANT BEDS FROM THE HIGHER HIMALAYA OF BHUTAN' published in CURRENT SCIENCE Vol. 51, No. 4, page 194.

The first para of the paper may be read as:

The Lingshi basin is situated in the Tethyan Belt of the Higher Himalaya of Bhutan. It forms a WNW-

ESE trending synclinalorium flanked to its south and east by the older crystalline rocks, while to the north and south-west lie respectively the Tethyan sedimentaries of the Tsang Po Valley and Phari basin of Tibet.

ANNOUNCEMENTS

INDIAN COUNCIL OF CHEMISTS

The Second Annual Conference of the Indian Council of Chemists will be held at Kashmir University, Srinagar on 6th, 7th and 8th November, 1982.

The Principle objective of the Conference will be to provide a forum for wide ranging discussions and critical debate of recent experimental results and theoretical ideas in different fields of Chemistry.

The Scietific programme will include invited papers, oral presentations, poster sessions and panel discussions. The high light of the programme will be a symposium on electrochemistry. There shall be special lectures by eminent scholars from all over the country.

Scientists are invited to submit two copies of the abstract (not more than 300 words with no diagram) by June 30, 1982. One copy of the abstract must be

sent to the Scietist in charge of the appropriate section and the other copy to Dr. Greesh Saxena, Dept. of Chemistry, R.B.S. College, Agra.

Names and addresses of the Scientists in charge of various sections: 1. *Symposium on Electro-Chemistry*: Prof. R. C. Kapoor, Department of Chemistry, Jodhpur University, Jodhpur; 2. *Physical Chemistry*: Prof. Aijaz Beg, Department of Chemistry, Aligarh Muslim University, Aligarh; 3. *Inorganic Chemistry*: Prof. M. M. Taquikhan, Director, Central Salt and Marine Chemical Research Institute, Gijubhai Badhetra Marg, Bhavnagar 364 002; 4. *Organic Chemistry*: Prof. M. S. R. Naidu, Department of Chemistry, Sri Venkateswara University, Tirupati; 5. *Biochemistry*: Prof. O. P. Malhotra, Department of Chemistry, Banaras Hindu University, Varanasi.