
BOOK REVIEWS

Annual Review of Astronomy and Astrophysics Vol. 19: (1981) G. Burbidge, D. Layzer, J. G. Phillips (Eds.), Published by Annual Review Inc., California pp. 479, Price \$ 20.

The Annual Reviews of Astronomy and Astrophysics are already firmly established as indispensable to workers in the field. The present volume confirms and even goes beyond this reputation. The fourteen articles cover a remarkably broad spectrum of contemporary and exciting topics in astronomy and astrophysics. For the radio astronomer, there are extragalactic compact sources and galactic maser sources — two of the areas where outstanding problems remain to be solved. For the theoretically minded, there are accretion disks and magnetic reconnection. The brief article on the extragalactic distance scale is a valuable introduction to a topic clouded both by intrinsic difficulties and long drawn out controversies. The same can be said for the review of absorption line observations of the enigmatic quasars. Nearer home, the articles on the dynamo theory and coronal heating mechanisms remind us of the unsolved problems concerning our own sun. The article on globular clusters, abundances, close binaries and the temperature scale reflect recent progress in the well established areas of stellar astronomy. The preliminary results of the Air Force infrared sky survey represent a large body of data which will undoubtedly form the basis of much future work in this era of multipronged, multiwavelength attack on the secrets of stars and galaxies. It is a happy circumstance that the Dutch astronomer J. H. Oort, who has devoted so many decades to unravelling just these secrets, has contributed a note on his life as an astronomer to this remarkably wide ranging and interesting volume.

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Analytic Number Theory—An Introduction by Richard Belaman. Published by The Benjamin Cummings Publishing Company Inc. Advanced Book Programme, Reading, Massachusetts U. S.A. 01867, Pages 195. Price \$19.50.

The present volume—a recent addition to the Mathematics Lecture Note Series—is concerned with providing an introduction to analytic number theory. The emphasis is on the mean value of some elementary arithmetic functions, the Euler ϕ function, the divisor

function $d(n)$, the square free function $\mu^2(n)$ and the prime divisor function $\omega(n)$.

As a prerequisite, the first seven chapters deal with inequalities and the estimate sums (Chap. 1) (including the Poisson formulas, (Chap. 6) rudiments of integral transforms (Chap. 2), some properties of the gamma (Chap. 4) and the Riemann Zeta functions (Chap. 5) and a 'whiff' of functional equation (Chap. 7). Some properties of congruence (Chap. 3) are also sketched.

The next half of the book—the last five chapters—outline the techniques to obtain the mean values of functions like $\phi(n)$, $\phi(n)^2$, $\phi(p(n))$ (Chap. 8) $d(n)$, $d(n)^2$, $d(an^2 + bn + c)$ $d(p(n))$ (Chap. 9), $\mu^2(n)$, $\mu^2(n^2 + 1)$ (Chap. 10) $\omega(n)$, $2^{\omega(n)}$ $\omega[g(n)]$ (Chap. 11), etc., besides illustrating the importance of Tauberian theorems in analytic number theory (Chap. 12).

'Much has been omitted' to quote the author—and thus the bibliography (as also the many short comments and the several shorter exercises) assumes greater significance in this context.

The style is 'Bellmanian'—informal (almost conversational), but no less deep; jaunty in the sense that it conveys faithfully more of the motivation, emphasising the process rather than the end product; simple, with the simplicity that is somewhat deceptive; and suggestive rather than exhaustive. ['We have merely sketched the principal result. The reader is urged to fill in the details' p. 45].

Those who like such an approach (the reviewer is one) will surely welcome this yet another addition to a field that is at once classical and modern.

What detracts one, however, is the production and not the presentation. The high level of printing is not matched by editing—there are several printing mistakes of various sorts—misrepresentation of equations p. 21 (eqn. 1), 63 (eqn. 3), 90 (sec. 5), 99 (eqn. 2); poor type set for exponentials, p. 36, 37, 97, 101, 115, etc., determinants (pp. 38, 39), continued fractions (p. 101); and also minor proof errors (p. 7 (Ex. 1), 66 (Ex. 1), 67 [eq. (1)], 69 [eq. (4)], 93, 99, 110) to give a sample. The subject index is inadequate and haphazard—it has just twenty-four entries.

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Organic Photochemistry, Volume 5, Editor A. Padwa, Marcell Dekker, Inc, New York and Basel, 1981, 502 pp., price \$ 65.

This is a volume devoted to synthetic application of organic photochemistry and is a continuation of a

series on organic photochemistry. The first four volumes (volumes 1-3 edited by O. L. Chapman and volume 4 by A. Padwa) have been well received by photochemists and no doubt this volume will find a way into the shelves of practising photochemists. It is well indexed (author and subject) and the chapters are well organized.

This volume contains five chapters and discusses the application of cycloaddition reactions (chapters 1 and 2), cleavage reactions (chapters 3 and 4) and reactions of imides in synthetic organic chemistry. Each chapter presents the required amount of the mechanism of the photoreaction which is to be applied as a synthetic tool. Coverage of the literature is not exhaustive but selective. Literature coverage in all chapters extend upto 1980. Authors of all chapters have succeeded in their attempts to convey that photochemical reactions are synthetically useful.

The first chapter on "Synthetic applications of the Paterno-Buchi reaction" by G. Jones (122 pages) presents both mechanistic details and synthetic applications of the addition of carbonyls to olefins. Literature coverage is commendable and most important references in this area are provided. The second chapter on "Synthetic aspects of (2+2) cycloadditions of α,β -unsaturated carbonyl compounds" by S. W. Baldwin (pages 103) is extremely interesting and the approach is original. It is a chapter to be read by all synthetic chemists who wish to use the above reaction. The relevant original references and reviews on this topic are included. The third chapter on "Photoextrusion of small molecules" by R. S. Givens (119 pages) discusses the elimination of nitrogen, carbonmonoxide, carbon dioxide and sulfur dioxide. This chapter covers critically one of the most interesting photo reactions; once again the literature coverage is highly commendable. The fourth chapter by D. Weiss on "The Norrish type I reaction in cycloalkanone photochemistry" (73 pages) is devoted to mechanistic aspects and the author has succeeded in presenting a critical review. Unfortunately synthetic applications of this reaction has not been dealt with in greater detail. Last chapter by P. Mazzocchi on "The photochemistry of imides" (50 pages) is restricted to describing reactions (α -cleavage, photoreduction, cycloaddition) of alicyclic imides and phthalimides. In the last few years substantial progress has been made in understanding the behaviour of imides and most of the literature has been covered.

Volume 5 is devoid of typographical, graphical and structural errors and is an essential addition to our libraries. Practising photochemists should seriously consider acquiring a copy.

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Annual Review of Biochemistry, Vol. 50, Editors: E. E. Snell, P. D. Boyer, A. Meister and C. C. Richardson, Annual Reviews Inc., Palo Alto, Calif. U.S.A. (1981) Price: US \$22.

Volume No. 50 for 1981 of Annual Review of Biochemistry has 1086 pages and 94 pages of index. The usual high quality is maintained. Undisputedly this is one of the most useful books for a biochemist. The subject of biochemistry is expanding so rapidly that it is impossible to keep pace with the developments even by the most voracious reader. In these days where little time is available besides laboratory work and other chores, the only way to keep a superficial knowledge of the boundaries of the biochemical science is to read Annual Reviews of Biochemistry. The present volume in the series has again collected a set of 36 articles to cover the canvas that gives the reader a panorama of the developments under each title not just for a year but the last few years. But in some reviews more old work is described than the current e.g. the review on amino acid degradation by anaerobic bacteria has 44 out of 77 references prior to 1975.

The prefatory chapter in this 50th volume was written by J. M. Luck, the founder of the series and the editor for the first 33 years. Under the title "Confessions of a Biochemist" he described the early years of the "ARB" and his own experiences in "the good old days" which were awful according to him. He also had some scathing remarks on scientific meetings. It is worth pondering over what he said: "our Universities might be well advised to give to their research people a few hundred dollars for staying away from monstrous meetings rather than for attending".

It is not easy to give a gist of all the articles and is not even possible for any single reviewer to appreciate the whole set of them. It is worth reading through to gain the knowledge of the subjects and each reader will be rewarded by new ideas in his own area of work. I will attempt to give a sample of highlights from a set of the reviews. The studies on formation of glutamate by clostridium and peptococcus "emphasized the fallacy of assuming that two organisms converting the same substrate to the same products necessarily contain the same enzymatic machinery". A number of articles have dealt with the general phenomenon of transfer of large molecules across membranes. How DNA penetrates the layers of peptidoglycan and the membrane with specificity and protection from cellular nucleases, possibly by binding to a protein forming an "eclipse complex" is now being studied intensively with new openings becoming available for artificial methods of introducing DNA into non-transformable bacteria and into eukaryotic cells. A

concept of molecular filters at the membranes described through electron microscopy as "Coated pits" is gaining ground to describe selective absorptive endocytosis of large molecules. "Coated vesicles are the apparatus by which membrane (and secreted) proteins are sorted out to travel to their different destinations". It appears that protein import into the intracellular organelles of mitochondria, peroxisomes and chloroplasts is a post-translational process not coupled to protein synthesis. The concept of signal peptide at N-terminal of the nascent protein destined for vectorial discharge of the protein had served a useful purpose but seems to "now burst at the seams as it can no longer accommodate" the new findings. It can be seen that the transport of proteins (and macromolecules) into the cell and out of it is an exciting fast-growing field. Along with this development the need to develop rapid protein sequencing is being felt and an article on this topic focused on the present methods and highlighted the requirement of faster techniques for large molecular weight proteins.

It is not possible to enumerate all the highlights of the 36 articles even briefly. Most of the developments of molecular biology are described and these include genetic transformation, DNA modifications, proteins and helical structure of DNA, restriction endonucleases, split genes coding for proteins, chromosome-mediated gene transfer, post-translational protein modifications, DNA topoisomerases and double helical DNA conformations. A variety of compounds of biological interest are described with respect to structure-function relationships—proteolipids, lectins, glycoprotein hormones, asparagine-linked oligosaccharides, microbial iron compounds, glycosphingolipids and transplantation antigens. Two articles dealt with bioenergetics with emphasis on proton transfer in cytochrome complexes and F_1 -ATPase. Also included are a number of biomedically-oriented articles on diabetes mellitus, diseases of immune development, fertilization, complement, inborn errors of amino acid metabolism, monoclonal antibodies and sterol biosynthesis.

I must also point out that the number of references of work of Indians has showed improvement although many other important publications from Indian laboratories could have been cited. On an overall assessment, the volume gives a good survey of the

multifaceted growth of biochemistry and every active biochemist will benefit by reading it.

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Applied Botany Abstracts (Vol. 1, No. 1)
(Economic Botany Information Service,
National Botanical Research Institute, Lucknow
226 0001, India), 1981. Annual Subscription for 4
numbers: Rs. 50.00; Foreign £ 10.00, \$20.00.

We welcome the appearance of this new abstracting journal. In these days of proliferation of journals and scientific literature all over the world, good abstracting journals for individual disciplines have become a necessity. With an International Advisory Board and a National Editorial Board in which the Universities, National Scientific Organizations and Industry are all represented, the journal under review holds out rich promise of giving useful service to the scientific community in the country in the years to come. This is, perhaps, the first journal in our country to be exclusively devoted to the Applied Botanical aspects, in particular, to various facets of Economic Botany. The coverage appears to be exhaustive, and journals published not only in India, but also abroad are abstracted. About 225 journals are covered. The Sections include: 1. Non-Agricultural/Non-Traditional/Under-Utilized Plants for non-edible oils and waxes, proteins and amino-acids, starches and sugars, gums, mucilages and resins and fibres and other cellulose products, 2. Biomass/Energy Plants for fuel crops, petro/alcohol-crops and latex/lubricant crops. 3. Ornamental Plants, 4. Plants and Environmental Pollution, 5. Traditional Herbal Drugs in pharmacognosy and botanical standardization, 6. Ethnobotany, 7. Endangered/Threatened Plants, 8. Other Economic Plants, 9. New Publications relating to books and periodicals, 10. Indices with key-word index and author index and 11. List of Journals consulted. Since there are other abstracting journals in the country for medicinal and aromatic plants, these subjects are not included in the present journal.

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