
BOOK REVIEWS

Annual Review of Biochemistry Published by Annual Reviews Inc., 4139, El Caminoway, Palo Alto, California 94306, USA. Vol. 54, 1985, pp. 1335, Price: USA: \$29.00; Elsewhere \$32.00.

The volume 54 of this series for 1985 has 35 articles, in 1335 pages of which 106 pages are used for index. I am disappointed this time by the introductory biographical article which probably reflects the changing life style of scientists as appropriately titled "Then and Now". It is hard not to appreciate the scholarship and benefits of this series. These reviews have always been lively, informative and authoritative. But there are many other serial reviews now coming and thus some repetition cannot be avoided. The title "Annual Review" can mislead that these reviews confine to what happened in the previous year but these cover the subject over a period usually 5–10 years. There is one article on creatine which has 50% of references older than 10 years. Thus they have become an annual collection of reviews. But the good feature, I must point out is that a majority of these reviews deal with developing frontiers of biochemical research. Subjects of cell biology, biophysics and biophysical chemistry, genetics and immunology are covered in other series by these publishers and some of the articles could very well have been transferred to these. Two articles on "Time resolved fluorescence of proteins" and "Application of neutron crystallography" to the study of dynamic and hydration properties of proteins" are examples. Such techniques and ideas should be introduced as part of a biochemical study for better understanding of a phenomena. Protein modification studies have been covered in a number of articles showing the sustained interest in this area: ADP ribosylation, thioredoxin and thiol-dithiol exchanges, carboxyl methyltransferases, chemical modification and enzyme specificity, site-specific amino acid modification, protein tryosine kinases and protein kinases in the brain. Studies of molecular basis of several phenomena are increasing rapidly. These are covered in several articles concerning protein export, cell adhesion, receptors and phosphoinositide-generated second messengers, inducible DNA repair systems, evolving ribosome structure, immune diversity and developmental regulation of human globin synthesis. With the rapid expansion of biochemistry and its diversification into many aspects of biological pheno-

mena, studying such review is the only way we can keep up with the literature. The reviewer feels that the biochemists should atleast read the perspective and summary of each of the article even if they are not working in or familiar with a field. This series must be possessed by the libraries wherever biochemistry interest exists.

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Annual Review of Phytopathology, Editor R. J. Cook. Associate Editors G. A. Zentmyer and E. B. Cowling (Published by Annual Reviews Inc. 4139 El Camino Way, Palo Alto, California 94306 USA) Vol. 23, 1985, pp. 535, Price: USA \$27.00, Elsewhere \$30.00

Professor Arthur Kelman has been honoured to write the prefatory chapter. He has critically analysed the role of plant pathologists in the society and in meeting the threat of population explosion (expected to be 6.1 billion around the turn of century). The article analyses methodically the advancing frontiers of plant pathology and accordingly stresses the need to define research goals and opportunities involving the whole world. The priority research areas have also been discussed.

The 21 review articles have been grouped into the following subtitles: historical perspectives (2 reviews), appraisal of plant disease (2 reviews), pathogens (5 reviews, 2 on fungi and 1 each on bacteria, nematodes and viruses), physiology of host-pathogen interaction (2 reviews), breeding for resistance (2 reviews), epidemiology (2 reviews), chemical control (2 reviews), biological control (1 review), and special topics (3 reviews). The reviews are followed by a subject index, contributing authors index of volumes 14–23 and chapter titles of volumes 14–23.

The historical reviews on Professor William Brown and Professor Ernst Gäumann, the giant pillars of plant pathology, are short and crisp mentioning the notable research achievements and certain very interesting personal anecdotes.

The potentials of the use of *Trichoderma* and

Gliocladium have been highlighted as seed/soil treatment or aerial application to fit in the integrated pest management practices. Geminiviruses (single-stranded-DNA molecules that are circular in form), which cause several very severe virus diseases of crop plants in tropical and warm temperate regions, have been worked out so intensively in the last few years that the complete nucleotide sequences of the genomes of four members of the group are already known; the review mentions the recent advances including genome organisation, replication, variation, evolutionary relationships, transmission and control. It has been concluded that the unconventional strategies in the breeding for the disease resistance (cell and tissue culture and recombinant DNA technology) will play a great role in future; it is, however, anticipated that there is both a risk and challenge in transferring the research results from the laboratory to the field. While reviewing specificity in cereal rusts, it has been concluded that one of the major bases of resistance is the antibiosis of the aegricorpus reproduction brought about by certain parasite: host: environment interaction. A definite parasite genotype and a definite host genotype function in a definite environment to produce a definite aegricorpus phenotype. It has been hypothesised that "the quantitative differences observed between aegricorpus genotypes commonly taken to be the result of nonspecific host effects are in fact due to such parasite: host: environment specificity."

The reviews on epidemiology of forest nursery diseases; biology, ecology and control of *Sclerotium rolfsii*; spatial analysis of soilborne pathogens and root diseases; the bioregulatory action of flavour compounds on fungal spores and other propagules (germination simulators); enzymatic penetration of plant cuticles by fungal pathogens; prospects of multiline cvs and variety mixtures for disease resistance; nematodes in agroecosystem; molecular genetics of bacteria; transposon mutagenesis and its potential for studying virulence genes in plant pathogens (including vectors for delivery of bacteriophage Mu, suicide vectors, etc); monoclonal antibodies; comparison of simulation approaches to epidemic modelling; chemical control of postharvest diseases (subtropical and tropical fruits); conceptual basis of crop loss assessment (the threshold theory); yield-limiting effect of resistance; plant pathology in the small farm context; are exhaustive, upto date, critical and informative, but the data generated in South-East-Asia has not been cited.

Exopolysaccharide (EPS) has been implicated in phytopathogenic bacteria (Ptb)-plant interaction as:

(a) induction of water-soaking symptoms, probably due to its hydrophilicity and water holding capacity (b) occlusion of vessels, leading to wilt (c) prevention of bacterial desiccation (d) filter or barrier function protecting bacteria against agglutinins or other plant-defense molecules (e) blocking recognition at the cell-cell interface between Ptb-plant. A hypermutable locus (loci) may control virulence (wilt induction in *Pseudomonas solanacearum*). Avirulence (non-wilting) in potato and lack of EPS production were caused by a single insertion of IS 50 (the transposable insertion sequence of Tn 5) into a 1.5 kb fragment. Chemically induced avirulent mutants of *Xanthomonas campestris* pv. *campestris* and Tn insertion mutants of *Erwinia amylovora*, *Pseudomonas syringae* pv. *phaseolicola*, pv. *syringae*, *glycinea* have been isolated and characterised. DNA-segments restoring the mutant phenotypes have been cloned from several pathogens. In the case of *X.c.* pv. *campestris* the defective production of extracellular protease and polygalacturonate lyase was fully restored in the mutant (to the wild type levels). Work on *Agrobacterium tumefaciens* (Ti-plamid, T-DNA-sequence, prokaryote-eukaryote-integration, vehicle plamid, etc.) has given enough evidence and confidence for genetic manipulation and biological control. Five avirulence genes were cloned from a race of *X.c.* pv. *malvacearum* that were incompatible within an equal number of single R gene differentials of cotton. The product of race-specificity genes form a heterodimeric complex with the products of complementary R-genes (of plants). The heterodimer (or multimer) is either itself lethal to the plant cell as it activates a host-defense system that leads to the restriction of further pathogen growth and death. This hypothesis may permit the isolation of the (so far elusive) products of R-genes.

The volume emphasises that phytobacteriology and biological control of plant pathogens have made enormous progress during a short period. The rare breakthroughs in the discovery of viroids and MLOs as etiological agents as well as the development of new recombinant DNA technology (genetic engineering) may totally change the direction of future science, specially in view of the use of plant pathogens as vectors for genes and introducing new genes in plants. Establishing research priorities has become essential, but it should not be done at the cost of classical plant pathological approaches. Short term approaches that result in air and ground-water pollution (which threaten the quality of environment and are economically unsound as well) must be abandoned. Environmental and related considerations have led to

the progressive decline in the availability and use of pesticides and fertilisers stressing the need to develop dependable biological control and innovative integrated crop management systems. There is a need for more intensive research on basic biology, ecology of epiphytic and soilborne pathogens and post-harvest technology.

The volume contains thought provoking articles which can generate immense interest and will be extremely useful not only to all plant pathologists but also to ecologists, geneticists, biochemists, epidemiologists, nematologists and also technocrats.

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Molecular Spectroscopy by P. S. Sindhu, Tata McGraw-Hill Publishing Company Ltd., 12/4, Asaf Ali Road, New Delhi 110002, 1985, p 352 + ix; price Not known.

This book is intended for undergraduate and post-graduate students for courses in Molecular Spectroscopy.

The text is divided into ten chapters. In the introductory chapter, background information common to all the spectroscopic techniques is presented. The next chapter is devoted to atomic spectroscopy, followed by a chapter on molecular symmetry briefly presenting group theoretical applications of symmetry to spectral problems. In chapter 4, the rotational spectra of diatomic and polyatomic molecules are explained. The succeeding two chapters deal with molecular vibrations and vibration-rotation spectra of diatomic and polyatomic molecules by infrared and Raman spectroscopy. Chapters 7 and 8 provide a discussion of the electronic spectra of diatomic and polyatomic molecules. Nuclear magnetic resonance and electron spin resonance spectroscopy are covered in the penultimate chapter, wherein a brief discussion on nuclear quadrupole resonance spectroscopy is also given. The final chapter is devoted to the Mössbauer spectroscopy chiefly of iron compounds. Some supplementary information is given in appendix. Towards the end of each chapter, there are a list of references, suggested references for further reading, and a few problems. Answers to selected problems are also provided.

While commending the author for his efforts, I must

point out several lacunae which this book suffers from. First of all, this book suffers very heavily from the language and scientific errors. Mention should also be made of numerous typographical errors and use of inappropriate words. The text is often confusing (for example, p. 1 – ‘Of course a theory is not only a picture and need not be understood entirely by way visual images but by understanding the problem more clearly’; p. 5 – ‘The similarity between radiation and matter initially was thought to be a matter of energy relation only’, etc). Regarding the scientific errors, I quote the following (p. 12 – ‘The transition moment is a vector quantity, more the vector direction coincide with the direction of propagation of photons, more intense the lines are likely to be’, p. 31 – ‘A point group can be represented by a matrix. Such a matrix which can be broken down to smaller matrices is called a reducible matrix or representation. . . .’). The treatment of the subject is not uniform. For instance, while experimental procedures are included for some methods (NMR, Mössbauer), they are not given for other techniques (Infrared, ESR, . . .). Many aspects utilizing ‘site symmetry’ are dealt with, the site symmetry itself is not defined however. The same situation exists regarding the symmetry class, etc. The electron-transfer transitions and spectra of transition metal ions have not been covered. Huckel molecular orbital method has not been presented. In contrast a sketch of ‘a more sophisticated’ molecular orbital method is given. There is almost no mention of the molar absorptivity or oscillator strength. The topic of resonance Raman could have been briefly dealt with instead of hyper Raman. The Fermi contact interaction is not discussed correctly and is mixed up with spin polarization mechanism. The NMR spin systems are not properly defined.

The use of arbitrary symbols like IR for irreducible representations should have been avoided. The IR is usually a standard abbreviation for infrared. It is discomfoting to see that the character tables do not list the transformation properties of the components of the rotational and translational vectors and their binary combinations. Table 3.6 (p. 38) is wrong since the translational (also rotational) vector components cannot be split as shown for degenerate representations. Some of the diagrams are not clearly drawn. (For example, figure 3.2 for SiF₂ and naphthalene; figure 4.2 (b), etc.). Many of the problems listed are outside the scope of the present text and most of them have been taken from I. N. Levine (Molecular Spectroscopy, Wiley (1975)), R. Chang (Basic Principles of Spectroscopy, McGraw-Hill (1971)), R.

S. Drago (Physical Methods in Inorganic Chemistry, East-West Press, New Delhi (1965)); of these the first two books seem to have not been listed anywhere. Incidentally the answer provided for problem 5.8 appears to be in error.

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Annual Review of Medicine: Selected Topics in the Clinical-Sciences, Vol. 36, by William P. Creger, Editor; C. H. Coggins, Associate Editor; E. W. Hancock, Associate Editor. (Annual Review Inc., 4139 EL Camino Way, Palo Alto, California 94306) 1985 pp. 658, Price: USA \$27; Elsewhere \$30

This volume begins with an interesting chapter on Nonoperative Management of Biliary Ostruction by Steven L. Dawson and Peter R. Mueller. The topic of prenatal diagnosis by Aminocentesis by Arthur Robinson and George P. Henry is enlightening and the article on Promoting Smoking Cessation by C. Tracy Orleans is very timely. Adverse effect of high levels of alcohol on foetus at any gestational stage is well

brought out by H. L. Rosett and Lyn Weiner. Calvin M. Kunin's article 'Does Kidney Infection Cause Renal Failure?' makes interesting reading. Genital herpes as a public health problem is rightly stressed by Thomas M. Becker and Andre J. Nahmias. The topic electrophysiology of acute myocardial ischaemic by Harry A. Fozzard and Jonathan C. Makielski and coronary disease in women by Nanette K. Wenger respectively have profound clinical implication. In the year of second centenary of discovery of Digoxin the article on Digitalis Toxicity by Elliott M. Antman and Thomas W. Smith is but appropriate. The subject of reversal of cardiac hypertrophy by Robert C. Tarazi and Fetnat M. Fouad gives an added relief to both the physicians and the hypertensive patients. The acquired immunodeficiency syndrome by Arthur Weiss, Harry Hollander and John Stobo is comprehensive and educative. In the context of rapid industrialisation, the topic on medical implications of shift-work by Martin C. Moore-Ede and Gary S. Richardson makes a far reaching and instructive effect on our present state of knowledge on the subject. Like earlier volumes, the perusal of the annual review of medicine volume 36 is an exercise in excellence and should be possessed both by the students as well as teachers not only for updating ones knowledge but also as a book of reference.

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