

biochemistry from the forties to the seventies. There are three reviews on coenzymes. The article on pyridoxal 5'-phosphate enzyme reviews progress made with a few aminotransferases, decarboxylases and racemases. In recent years many enzymes containing the pyruvoyl group cofactor instead of pyridoxal phosphate have been identified. Their mechanism of action, regulation, etc. are covered in the second review. The third article on coenzymes deals with the unusual ones found in methanogenic bacteria. These archaeobacteria differ from eubacteria in a variety of properties, and possess new metabolic pathways and unconventional coenzymes.

Among the four immunology reviews, the article on antigen-antibody complexes deals with the interaction of antibody Fab's with specific haptens and proteins. Binding studies, structural aspects, model-building studies, and their practical application in the development of 'abzymes', diagnostics and therapy are discussed. The review of cytokines gives an overview on the interleukins and other cytokines, and regulation of expression of their genes. The structure and function of cytokine receptors and their role in signal transduction are described. The other two reviews—one on T-cell receptors and the other on class I MHC molecules—deal with more recent developments. The cloning of T-cell receptor genes has led to analysis of receptor polypeptides, gene organization and rearrangements, and T-cell target specificity. This in turn has yielded information on T-cell differentiation and repertoire selection. MHC molecules present antigen in a processed form to the T-cell receptor. There are two classes of MHC glycoproteins; the members of the first family present antigens to the T cells that express CD8 cell-surface glycoprotein while the class II molecules present antigens to CD4-expressing T cells. The article on MHC deals with the three-dimensional structure of one such class I MHC molecule (HLA-A2), the diversity of such molecules, and their interaction with CD8 glycoprotein and T-cell receptor.

There are several chapters in molecular biology. DNA unwinding is an integral event during replication, transcription, recombination and conjugation. The unwinding and the concomitant hydrolysis of nucleotide 5'-triphosphates is

brought about by helicases. Helicases of various types from different systems have been reviewed. Ten helicases have been discovered in *E. coli* itself. These enzymes differ in size, location in the genome and in their specialized roles in cellular function. Another review deals with sequence-dependent curvature of naked DNA. Such bent structures, observed in several instances, may have functional relevance. Chemical nucleases are organic compounds used as probes to study protein-nucleic acid interactions. Now a variety of compounds are extensively used to analyse unusual nucleic-acid structures (such as DNA curvature) and protein-nucleic acid complexes. Some of these chemicals are being 'tailored' to act as site-specific targeting agents. The helix-turn-helix motif is found in many DNA-binding proteins with regulatory functions. One review focuses on X-ray crystallographic studies on phage 434 repressor, Cro, and other well-characterized proteins and their complexes with DNA. Six different kinds of HTH motif are found in various DNA-binding proteins, which act as either activators or repressors. In all the cases, some helices form bundles—with different numbers of helices in different proteins—for DNA recognition, while the rest of the helices take part in dimerization or other functions. The amino-terminal ends of the helices in the bundle are positively charged, enabling them to contact phosphates in DNA. T. Cech's review updates information on group I introns. RNA forms the catalytic centre in this class of introns, and the 'enzymology' of the process is described. B. Moss' article on regulation of vaccinia virus transcription covers the entire molecular biology of the system. Vaccinia are large, self-sufficient viruses with unique features like cytoplasmic replication and virus-coded multisubunit RNA polymerase. The information in this review is invaluable towards developing improved expression systems. In spite of the discovery of a variety of transcription factors and a large body of knowledge on RNA polymerases, the molecular interactions involved in transcription initiation are not completely elucidated. A review in this volume gives a detailed account of structure and function of different subunits of RNA polymerase B and their interaction with various transcription factors. An account of the structure of

the collagen gene family is presented in another article. The different collagens, the gene organization, regulatory elements, and structural alterations by mutations are described.

Endotoxins are lipopolysaccharides (LPS) located on the outer surface of gram-negative bacteria. Lipid A is the major component of endotoxins and has unique structure. Since it is essential for the growth of the organism, the biosynthetic pathway of this molecule is an attractive target for developing new drugs. The biochemistry of lipid A, the O-antigens, their biosynthesis, transport of LPS to the outer membrane, and interactions of LPS in the animal system have been reviewed.

Cadherins are a class of molecules involved in Ca^{++} -dependent cell-cell adhesion. Animal cells recognize each other and selectively adhere to particular cell types. Recent developments in the area have been summarized. Other articles review clathrins, phytochelatin, selenium-binding proteins, peptides of frog skin, and protein folding patterns.

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Practical pest control

Pest Management in Tea. N. Muraleedharan, The United Planters' Association of South India, Tea Research Institute, Valparai 642 127. 1991. 130 pp.

The publication of a monograph on pest management of tea is a timely one, because, for India, a major tea producing and exporting country, information regarding pest management is very relevant for increased production. The author, an experienced tea entomologist, introduces the reader to the basic concepts of pest management, necessarily involving the ecology of pest control, economic threshold levels, crop resistance, biocontrol, and pheromonal, genetic and chemical controls. He rightly indicates that indiscriminate application of chemical pesticides leads to pest outbreaks, which is typical of the tea crop. He gives some familiar instances of outbreaks of several species of

caterpillars after the application of Heptachlor, which also eliminates natural enemies of the pests. The universally accepted concept of integrated pest management (IPM) has been advocated as one 'involving a pest management system that, in the context of the associated environment and the population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible a manner as possible and maintains the pest population at levels below those causing economic injury'. However, a little emphasis on IPM techniques in tea pest management with a model or two would have been really useful.

The major portion of the book has been devoted to the pests of the tea plant and the information provided goes a long way in providing an understanding of the species involved, the nature of the damage they cause, and their control. Photographs and line drawings supplement the details provided. The pest species have been classified into mites, insects and non-arthropods. The mites include a host of categories, the pink, purple, scarlet, yellow and red spider mites. Among insect pests, the tea mosquito, lygaeid bug, tea aphids, scale insects and mealy bugs, jassids and thrips, besides several caterpillar pests including flush worm, tea tortrix, tea leaf rollers, leaf webbers and looper caterpillars and twig caterpillars are included. Beetles and weevils, notably the short-hole borers, are discussed.

Among the non-arthropods, nematodes and rodents find a place, in particular the root-knot nematodes.

The chapter on pesticides and their application, in forms such as dusts, granules, wettable powders, emulsifiable concentrates, water-soluble concentrates and fumigants, is very informative. Equally valuable is the information on spray volume, hazards and safety, pesticide poisoning and first aid. A very useful appendix of the chemicals used for pest control of each pest species, pesticide dosage and effects is also provided. The list of references is useful.

On the whole, this is a very handy and useful volume not only to entomologists interested in the tea ecosystem, but to other entomologists interested in pests and pest control.

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Brief review

Elementary Geology. P. S. Saklani, Today and Tomorrow's Printers and Publishers, New Delhi, 1991, 77 pp.

This small book deals essentially with the task of introducing laymen to the constituent parts of geology. The text is profusely illustrated with appropriate sketches selected from various books on

this subject. This will certainly enable the reader to get a better idea of the subject matter. Almost all branches and aspects of geology and applied geology are very briefly touched upon, so that even a novice will get to appreciate the importance of earth science in understanding our planet, the forces acting in it and on it, its natural resources, and the usual methods of exploration and exploitation of minerals. If the treatment of each topic (solar system, interior of the earth, plate tectonics, geomorphological agents, crystal systems, minerals, rocks, life, ground water, mining, engineering geology, etc.) appears to be cursory that is mainly because of the limited scope of the book, which is meant for a beginner.

It is unfortunate that in a book of this kind, well planned to cater to the needs of the uninitiated, there are errors of grammar, spelling, punctuation, and/or, occasionally, facts in almost every page. It is hoped that the author will take special pains to rectify these errors if a second edition is planned or publishes an 'Errata' and appends it to every copy of the present edition. This book is recommended for an introductory course in geology at the 'plus two' stage for Indian students.

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Correction

A novel approach to design of *cis*-acting DNA structural elements for regulation of gene expression *in vivo*

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Samir K. Brahmachari writes:

On page 589, the decrease in β -galactosidase activity should read 2.8-fold instead of 28-fold. Correspondingly, in Table 2, specific activity for pSBC1-containing *E. coli* cells should read 125,200 (36 %) instead of 12,520 (3.6 %). Accordingly corrected figure 7 showing

β -galactosidase activity is given below. Our main conclusion remains unaltered.

