

in order to catalyse this process. Broad-based initiatives which bring the concept into practice using local resources would be necessary. This also suggests that research effort is needed for the evolution and adoption of organizational structures suitable for the task on hand in the region where the initiative takes shape. The apparent apathy in 'science in education' can be overcome only through multiple techniques and structures. Perhaps the disavowal of the editors about the book not being a 'cogent articulation of various tenets' clearly recognizes the need for further effort. The mention of a 'think tank' might draw cynical expressions of elitism but the time is opportune for one or more 'think tanks' to address these issues and develop a menu of options to carry Yash Pal's lead concepts onward; local groups could choose their strategy from this menu for use as suits circumstances in their area. The ideas sprouting from the studies will motivate policy-making at governmental and other levels. This should lead to the gradual infusion of science in national culture. Thoughtful leaders of public opinion (of the kind who have contributed to this book) should also find out how the stated objective could be reached in an environment of limits to the efficacy of governmental patronage.

R. PARTHASARATHY

S-23 Golden Enclave
Airport Road
Bangalore 560 017, India

Annual Review of Cell Biology 1994.

J. A. Spudich, S. L. McKnight, R. Schekman, eds. Annual Reviews Inc., Palo Alto, California, USA. vol. 10. 478 pp. Price: USA \$ 49; elsewhere \$ 54.

Cellular biology continues to grow and diversify, encompassing the broad areas of biochemistry, genetics and molecular biology, in order to obtain an understanding of the inner working of the cell in molecular terms. These endeavours have now been extended to the study of whole life forms, as topics in developmental biology find a larger representation in this volume of *Annual Review of Cell*

Biology, paving the way for a formal merger of these two disciplines from 1995 onwards, when the name of the series will change to *Annual Review of Cell and Developmental Biology*.

The pathways that control cell growth and differentiation, in mammals in particular, are undoubtedly complex. Recent progress in this field has been remarkable and five reviews are devoted to advances in the broad area of cell regulation. In a lucid article by D. J. Riley and coworkers on the retinoblastoma protein, the properties of this key regulator of cell division have been discussed. In the normal cell cycle, activated retinoblastoma protein restricts further cell proliferation. However, binding of oncogene products to this protein can block its activity and lead to unscheduled cell division, resulting in malignancy. U. Siebenlist and coworkers have reviewed the structure and functions of the transcription factor NF κ B family of proteins, which serve to coordinate the rapid induction of a range of defence genes in the immune system. A unique feature of NF κ B is its rapid translocation from the cytoplasm to the nucleus in response to extracellular signals, and the complexities of this process have been analysed in depth.

Signal transduction pathways in the cell basically depend on the fine tuning of phosphorylation of specific proteins by kinases and phosphatases. P. van der Geer and others have given a detailed account of a major class of transmembrane receptors called the receptor protein-tyrosine kinases. Studies on these kinases have contributed significantly to an understanding of how cells are regulated by extracellular signals. S. Shenolikar has written a comprehensive review on the protein serine/threonine phosphatases, highlighting their physiological functions and cellular regulation. A group of proteins that play a crucial role in signal transduction pathways are the GTPases. T. A. Glomset and C. C. Farnsworth have documented the different posttranslational modifications found in these GTPases (such as farnesylation of the carboxy terminus and acylation of the amino terminus) and presented evidence for their role in determining the interactions between the GTPases and the cell membranes. Additional studies are required before the functions of these modifications are firmly established.

In the area of intracellular sorting of

proteins, which found exhaustive coverage in last year's volume, there is a single review on protein targeting to the endoplasmic reticulum by P. Walter and A. E. Johnson, which emphasizes the common steps in targeting in eukaryotes and prokaryotes. However, the mechanism of translocation of the nascent protein across the endoplasmic reticulum remains less well-defined.

The cytoskeletal framework of the cell, for long a favoured topic for cell morphologists, is emerging as a dynamic and complex structure, subject to a variety of regulatory phenomena. Five reviews are devoted to recent developments on the structure and function of cytoskeletal and associated proteins. A. Hall has contributed a highly topical review on the regulation of the actin cytoskeleton in response to extracellular signals through the ras family of small GTP-binding proteins. A comprehensive review on the three-dimensional structures of 12 actin-binding proteins has been provided by T. D. Pollard and others. E. L. F. Holzbaur and R. B. Vallee have discussed the recent findings on the structure and functions of dyneins, one of the largest and most complex motor proteins. A major class of cytoskeletal proteins, the microtubules, are involved in cellular elongation and cytokinesis. Their role in cellular patterning in the growing plant has been elegantly discussed by R. J. Cyr, who has also presented a hypothesis for the mechanism by which microtubules bring about cellular elongation.

Vertebrate limb development has been one of the best-studied systems for understanding cell and tissue patterning, mechanisms of innervation, cell differentiation, angiogenesis and programmed cell death. C. Tickle and G. Eichele have reviewed the embryological data on limb patterning, and presented recent work that has begun to unravel the molecular responses to signalling molecules involved in the process.

Intensive research on the mechanism of Alzheimer's disease has led to the identification of cerebral deposits of the amyloid β protein as the causative agent of the disease. D. J. Selkoe has reviewed the cell biology, in particular the intracellular processing, of the amyloid β protein precursor. Several mechanisms have been proposed for the eventual imbalance between amyloid β protein formation and clearance which results in

BOOK REVIEWS

amyloid deposits. Pharmacological intervention in the disease process is being attempted at various points along the amyloidogenic pathway, and may have the potential of being used to slow down the gradual accumulation of amyloid deposits that accompanies normal aging of the human brain

This volume of the *Annual Review of Cell Biology* truly 'unifies a diverse and rapidly expanding field'. The reviews are selective and critical in format rather than exhaustive. An essential book for all researchers in cell biology.

VEENA K. PARNAIK

*Centre for Cellular & Molecular Biology
Hyderabad 500 007, India*

Environment and Adaptive Biology of Plants. Professor David N. Sen Commemoration Volume. D. D. Chawan, ed. Scientific Publishers, 5A, New Pali Road, Jodhpur 342 001, India. 1995. Price: Not known. 322 pp.

Environment and adaptive biology of plants is one of the topics of past, present and future scientific interest. Much of the progress we have made in crop selection and breeding have stemmed from basic understanding of plant adaptation to environmental conditions. The success of introduced agricultural, horticultural and timber plants all over the world, ever since humans began transporting them, has also been a result of our knowledge of plant adaptability to different environment.

Current interests in plant adaptive biology worldwide are in the areas of (1) *in situ* protection and management of en-

dangered plants, (2) sustaining productivity in crop plants, (3) identifying locally evolved resistance to pests, diseases and other environmental stresses, (4) reclamation and revegetation of degraded landscapes and (5) management of increasing salt and water stresses in coastal and semi-arid zones.

Considerable progress has been made in the above fields of environmental science both in India and abroad. Our knowledge of dioecious plants (especially in the genus *Garcinia*) being capable of reproducing apomictically on isolation is helpful in the management of threatened species. Case studies of such plants shed light on survival strategies that isolated plants adopt at the expense of genetic variability. Land races that are locally adapted are in much demand today for crop improvement and sustainable agriculture. Most recent interest has been in understanding the mechanisms plants have adopted in dealing with salt stress. Of special importance in this regard are the estuarine plants, commonly referred to as mangroves. Mangrove plants in the genus *Rhizophora* are known to localize the salt in the root zone itself. These plants, which are also capable of withstanding flooded conditions, can be the answer to ecological problems that might arise in the event of the anticipated sea level rise. Research on the physiology and genetics of mangrove plants is under way, especially in an effort to identify 'plus' trees (supertrees which can withstand considerable amounts of environmental stress). A major programme in this field of interest has been on at the M. S. Swaminathan Research Foundation, sponsored by the Department of Biotechnology, Government of India.

The book under review is the most unusual blend of biography, science, documentation and advertisement. The book is divided into six parts, viz., (1)

Ecology and environment management, (2) Adaptive biology, (3) Biology of saline plants, (4) Weed biology, weed management and allelopathy, (5) Desertification and agroforestry and (6) Environmental pollution. Two to five papers have been included under each of these major parts. These papers vary in style from being introductory to highly structured experiments and results, making reading rather uncomfortable. Papers have not been appropriately grouped. For instance, Part 1 includes an ethnobotanical document which merely lists plants used by natives in the Narmada valley. Similarly, in Part 4, one paper provides a detailed list of weeds associated with crop fields of Madhya Pradesh without any reference to management.

The strength of this book, however, rests in Part 3, which discusses a topic of current scientific interest. It appropriately includes papers on mangrove plants and those in salt-prone deserts of India. Although the discussions fall short of being comprehensive, the papers are more in tune with the broad title of the book than the rest.

The book, in general, fails to address current issues relating to the environment and adaptive biology of plants. All detailed discussions included have emerged from laboratory studies paying little attention to field conditions. Most papers are not even state-of-the-art treatises of the concerned science, not even of that in India. To a serious student of plant adaptive biology, the book can well prove disappointing.

R. J. RANJIT DANIELS

*M. S. Swaminathan Research Foundation
3rd Cross Street
Taramani Institutional Area
Madras 600 113, India*