Physiologie Végétale II Croissance et Développement edited by P MAZLIAK. Hermann, Paris, 1982 465 pp 195F

This second volume of a two-volume student textbook has appeared some five years after the first, which dealt with plant nutrition and intermediary metabolism This one is divided into five chapters covering in turn growth substances, phytochrome, germination, growth, flowering and differentiation with morphogenesis The publication seems to have been delayed somewhat in production, judging from the reading lists at the end of each chapter Some delay is apparent in the fact that the biosynthetic pathway of ethylene gives methional as a precursor rather than 1-aminocyclopropane-1-carboxylic acid However, the text is generally reasonably up-to-date with much recent material (e g a chromosome map of the maize chloroplast genome) included along with the more traditional teaching matter of plant physiology

A particular merit of this text are the excellent diagrams and illustrations (in two colours), which appear on almost every page, a great deal of information is thus presented in a very attractive way In general, the approach is analytical and various theories about plant growth and development are considered critically in the light of the evidence available The text touches on many topics from the effect of light on leaf movement and auxin structural analogues to carrot tissues in culture and plant lectins As an introduction to modern plant physiology, it is nicely produced and deserves to be widely read

Plant Science Laboratories, University of Reading JEFFREY B HARBORNE

The Cytoskeleton in Plant Growth and Development: edited by CLIVE W LLOYD Academic Press, London, 1982 480 pp £32 40

A fully authoritative account of the cytoskeleton in general has yet to be published and, certainly, nothing devoted to the plant cytoskeleton is currently available For this latter reason alone, this book is to be welcomed The reviewer has, however, learnt to approach with great trepidation any book on cell-biological events solely in plants, for he well recalls how swiftly the pattern of flying bombs descending upon London was transformed into the distribution of poppies in a field of barley—once his undergraduate lecturer had recalled which particular statistics group he was teaching Happily, in editing 'The Cytoskeleton in Plant Growth and Development' Clive Lloyd has avoided this pitfall and only teetered at the brink of one or two others He has sensibly divided the work into discrete sections on the cytoskeleton itself, the cytoskeleton and the cell wall, cell division, and the cytoskeleton in cell and tissue morphology With one or two fairly major lapses, he has maintained a botanical theme throughout

The section on the cytoskeleton *per se* commences with an excellent and simply written chapter by Jackson on actinomyosin—summarizing honestly the extent to which actin and myosin have been characterised in plant tissue Microtubules are then considered by Hyams in a very conversational manner, commendably he does not devote too much space to hypothetical models of microtubular operation (although the principal onces are mentioned) but attempts to give a well-rendered account of all aspects of the organelles The treatment of microtubule organising centres (MTOCs) by Brown, Stearns and MacRae is satisfactory, with a considerable devotion to plants With our knowledge in its present state, plant MTOCs are not easy to write about in any degree of accuracy—quite simply not much is known about them Nevertheless this chapter contains a fair amount of useful data and comment without giving too much of an impression that MTOCs are composed of cytoplasmic phlogiston The inclusion of calmodulin in the book might be regarded as a gamble, but the chapter by Schleicher *et al* is good and fits in well, justifying its position page by page This first section thus emerges as a little light in hypothesis—to be applauded—and comprehensive with respect to those subjects covered It is curious however that Lloyd has chosen to omit the 'nuclear skeleton' from this section and indeed, from the book Surely events in the nucleus, particularly those occurring both in premeiotic interphase and in meiotic prophase provide evidence of mechanical organisation? Curiouser, even, is the editor's omission from this section of his own work on 5–7 nm filaments present in association with the nucleus in *Daucus* sp protoplasts They do, at least, appear later in the volume

There is little doubt that the plant cell exoskeleton—the cell wall—interacts very closely with the endo(cyto)skeleton and, in recognition of this, a section of the book is devoted to the relationship The first chapter, on the microtubule-microfibril syndrome introduces the topic, citing examples from throughout the plant kingdom Then follows an overview of cell wall biosynthesis by Maclachlan and Fêvre which, while valuable in its own right, probably has less place in this volume than most of the other contributions If the editor wishes to include the cell wall in the 'cytoskeleton' he should not only say so, but also enlarge this section to include many other aspects of cell walls Back to microtubules and microfibrils, the last two chapters in this section by Montezinos, and Heath and Seagull respectively cover in some considerable depth the rôle of the plasma membrane, and the various current models of the mechanism by which microfibril biosynthesis may be controlled by the protoplast Deep amongst these complex hypotheses discussed by Heath and Seagull, it is a relief to note an air of realism with which they acknowledge that virtually all of these models remain completely untestable

In the reviewer's humble opinion, it is in the section on cell division that some of the star contributions occur, perhaps not the first—an overview of the cytoskeleton in mitosis—for most of the examples involve crane-fly spermatocytes which serve only to bring those flying bombs to mind again, perhaps a little unfairly since there is not much real data available from plant cells The editor and Barlow then follow with a detailed but courageous chapter on the co-ordination between division and elongation Here is much new, valuable, information set out with much thought When considering the cytoskeleton in

development, it is vital for it to be linked to the cell cycle and also to be seen in evolutionary terms Reviewing work from the 1870s to the present day, Gunning's contribution on the cytokinetic apparatus is a *tour de force* First rate diagrams, light and electron micrographs together with a logical approach to each stage of plant cell division make these 63 pages alone good reasons for buying this book The quality is not over yet, for the next (and most ambitious) section on cell and tissue morphology contains some excellent work Marchant's chapter on cell shape examines the myriad morphologies of the algae and attempts—with some success—to explain them in terms of the cytoskeleton, concentrating not only on simple morphogenesis, but also on the establishment of shape by directed division

While there is no doubt that the contribution on morphogenesis in moss protonemata by Schnepf is distilled from a vast body of data, it probably does not fit in this volume as comfortably as most of the other contributions There is some mention of the cytoskeleton, but the diagrams and micrographs are sometimes difficult to interpret, and the bulk of the work is concerned with the effect of a number of inhibitors for cell morphology The rôle of the cytoskeleton in the organisation of the cells of the stomatal complex is next examined by Palevitz in a chapter that ranks with that of Gunning Using techniques ranging from simple measurement, via about every type of light microscopy, to very high quality electron microscopy (for once some very convincing microtubule bridges), this author leads the reader through all aspects of the development of these cells, finally convincing him/her that, in the stomatal complex, we have a plant system through which we can gain real understanding of the way the cytoskeleton operates

Finally, in a particularly brave chapter, Hardham attempts to draw the threads together and discuss regulation and polarity in tissues and organs Refreshingly bereft of generalizations this contribution is really first-class In a stylish interplay between electron micrographs, line diagrams and micromorphometric data Hardham reveals that events within a single cell really can be related to the tissue within which it is developing

A full set of references completes this well-produced book In summary, Clive Lloyd has managed (through deft footwork in some cases) to avoid the pitfalls mentioned earlier, and edited a most relevant and useful book In retrospect a little more on microtubule action, the 'nuclear skeleton' and techniques might have been welcome, but these are only minor criticisms Quite simply this book is essential reading for anyone, phytochemist or otherwise, who will want to hold an intelligent conversation on plant cell development and division in five years time £32 might seem expensive, but when compared with 0 5 mCi of ^{3}Hthymidine, it begins to look like quite a bargain

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Alkaloids—Chemical and Biological Perspectives, Vol. 1: edited by S W PELLETIER John Wiley, 1983 398 pp £53 40

This volume is the first in a new series which aims at an interdisciplinary approach to the chemical and biological properties of the important class of natural products known as the alkaloids A new volume is scheduled for publication every 12–18 months and will contain some 350–400 pages Information given in the series will include chapters on structure elucidation, chemical properties, synthesis, biogenesis, pharmacology, physiology, taxonomy, spectroscopy and X-ray crystallography The series is aimed at a wide range of scientists, including those engaged in medicinal and natural product chemistry, pharmacognosy, pharmacology, biochemistry, phytochemistry, plant taxonomy, oncology, forensic science and medicine What then of volume 1, the first runner from this new stable?

There are five chapters in this first volume and they deal with the nature and definition of an alkaloid (33 pages), arthropod alkaloids (52 pages), biosynthesis and metabolism of tobacco alkaloids (70 pages), toxicology and pharmacology of diterpene alkaloids (58 pages) and the chemotaxonomy of indole alkaloids obtained from the three families Apocynaceae, Loganiaceae and Rubiaceae (166 pages) In the introductory chapter, written by the editor, the definition of an alkaloid is discussed and it is stated that "An alkaloid is like my wife I can recognise her when I see her, but I can't define her " In this context the field of alkaloids is reviewed concisely, illustrating the diversity of chemical structures which make up some 5000 natural products occurring in organisms ranging from moulds to ladybirds The former definition of 'an alkaloid' excludes so many 'alkaloid-like' compounds that the author proposes a new definition as "a cyclic organic compound containing nitrogen in a negative oxidation state which is of limited distribution among living organisms"

Arthropods account for more than 80% of animal species and they produce a wide range of alkaloids, some of which function as pheromones and allomones. The second chapter reviews the present state of knowledge and points out that "when it comes to arthropod alkaloids, the best is yet to come" Tobacco alkaloids are of enormous interest and over 2000 publications are available on this particular topic Nevertheless the chapter on their biosynthesis and metabolism written by E Leete is a welcome addition to the literature Even so, as the author points out, there is still no satisfactory answer to the question "Why is nicotine produced by tobacco?" The toxicology and pharmacology of diterpenoid alkaloids is another fascinating area of alkaloid research, particularly since species of *Aconitum* and *Delphinium* are sources of poisons and medicinal agents and as a pharmacist I found the approach to this particular chapter most interesting

The final chapter, a monumental one, is written by two organic chemists and a plant taxonomist who can bring together their two specialist areas The chemotaxonomic ideas are of interest but, in my view, their approach is too complicated and not always accurate The biogenetic relationships of indole alkaloids with a C_9 or C_{10}