Reviews


In the book of papers presented at the first International Plant Transport Workshop in Liverpool, published in 1973, there were really no contributions concerning direct studies of the plant plasma membrane and associated enzymic reactions. In contrast, the book of the Venice Workshop, held in 1989, was dominated by studies on isolated plasma membranes and the associated ATPases, redox reactions, pumps and channels. The tremendous progress that has taken place over the last fifteen years or so is the basis for this present volume, although it is not restricted to transport processes. It is due to advances in many techniques, but mostly to success in isolating purified plasma membrane fractions by density gradient and phase partition procedures.

This volume attempts to cover all aspects of current research on the plant plasma membrane. It consists of sixteen chapters, each written by an expert in the field. It covers plasma membrane organization, isolation, an evaluation of potential markers and its cytchemistry. Transport properties are discussed with chapters on the ATPases, redox processes, the use of isolated vesicles and the electrophysiological approach. Structural aspects include the relationship of the plasma membrane to coated pits, cellulose synthesis and the cytoskeleton. Further chapters consider the role of this membrane in cold acclimation, host-pathogen interactions and symbiosis. The final contribution considers the potential for the molecular biology of the plasma membrane.

Overall this is a well-balanced, fully illustrated and very timely text. It is a valuable summary of the rapid progress made in our knowledge of this membrane over the last twenty years; the next decade promises to be equally exciting and should see the isolation and characterization of certain pumps, receptors, carriers, channels and protein kinases. It is a must for libraries but will be beyond the budget of most individuals. The book of the 1973 Workshop cost £10 for 630 pages; the present volume costs some eight times this amount for 418 pages. Such is progress!

J. L. Hall


Algae are the Jacob’s coat of the plant kingdom. They possess more pigments than Poussin ever dreamed of. Inadequately served by the chlorophylls that satisfy the photosynthetic needs of most plants, each algal group has, in addition, evolved its own distinct menu of accessory pigments. Some of them enable the plants to absorb the aberrantly coloured light that filters to them beneath the waves, others shield these essentially ‘shade plants’ if they are exposed to the full glare of daylight when abandoned by the tide.

Professor Rowan’s book is not, however, concerned with the ecological significance of algal pigments; it is a straightforward account of the various pigments and their distribution in different algal groups. Almost half the book is devoted to the structure, biosynthesis and physical properties of the major algal pigments.

The book is nothing if not comprehensive. It embraces numerous mega-tables, some of which range over page after page, listing the taxonomic distribution of carotenoids, light absorption maxima, R, values of lipid soluble pigments, the descriptive, systematic names of pigments (each as long as a Welsh signpost) and dozens of other properties.

Over a tenth of the book deals with what I imagine is a special interest of Professor Rowan; pigments as taxonomic characters. Algae are unusual in that historically they have been separated on a biochemical character. Qualitative analysis of pigment content clearly designates the phylum to which an alga belongs. Chapter seven of the book discusses pigments as clues to the evolution and phylogeny of algae. They are undoubtedly important indicators of affinities, but not the only ones. It is a pity that the author does not compare the phylogenetic trees reliant on pigments alone, with those constructed from consideration of a much wider range of characters.

Over 50 pages of the book are allocated to practical matters such as extraction and separation of pigments, making it a useful recipe book for students wishing to carry out such procedures.

In general the text is clearly written, although more careful proofreading would have eliminated a light peppering of typographical errors and mis-spellings of several species names.

Although it is too dense to make a good book at bedtime, it is a very comprehensive treatment of its limited field, and the 900 references alone should prove a rich source for

Ginseng has a worldwide reputation as being a panacea for all ills and has a considerable commercial following. Thus I was intrigued to read that the author, who has written extensively on medicinal plants, somewhat irreverently asserted that he was not sure whether ginseng was better than carrot even though it was 600 times more expensive. He also acknowledged that he had considerable scepticism of scientific reports which extol the virtues of ginseng. I warmed to his frankness and to his chatty style.

The various chapters deal with taxonomy, history, Siberian ginseng, carrots and ginseng, root booster, herbal teas, chemistry, pharmacology, immunology, pathogens, other pests, agroecology, economics and the law. As a genus, Panax has received more botanical revisions in recent years than any other and thus I expected to read a concise account of why this had been necessary and what arguments had been advanced by those taxonomists who were bold enough to tackle this knotty problem. Sadly there was no such in-depth coverage. The author admitted that difficulties may be encountered in distinguishing between the species, P. quinquefolius and P. trifolius. Botanical authorities were given for only three species (one incorrectly) but not for other species. What does emerge from this chapter is that there are a number of different species and indeed two main genera, Panax and Eleutherococcus, which constitute the ginsengs of commerce.

There is a lack of conciseness for the chemistry buffs who do like to communicate by means of chemical structures - not one in sight, I looked in vain. The mystique of the names given to the active principles, the ginsenosides as Rb1, Rb2, etc. is not revealed and neither are their chemical structures.

But don't knock it! The ancient Chinese used the roots for quietening the spirit, curbing the emotion, stopping agitation, removing noxious influences, enlightening the mind, increasing wisdom and for longevity and they knew nothing about the chemical constituents. There is a wealth of literature on the pharmacology, some of it of doubtful scientific value for a multitude of reasons. Nevertheless, there is scientific evidence to show that ginseng is not a mere placebo and that it is a potent medicinal plant. Despite the multiplicity of pharmacological claims, it probably sells because of its reputation as being an adaptogen (not a scientifically accepted pharmacological term) and as an aphrodisiac. It is not without its side effects and some of these are covered although the severity of oestrogenic effects in postmenopausal women is seriously underplayed.

Some of the chapters feature other herbs such as ginger, sarsaparilla, sassafras, basil, dill, oregano, parsley and even coca so that you may think that you are getting more than your money's worth. The two chapters on pathogens and other pests do not deal with the miraculous properties of ginseng but rather with their effects on the growth and production of ginseng plants.

The book is easy to read and is aimed at the layman as exemplified by the chapter on immunology which considers lymphocytes as the Strategic Defence Command. For further reading more than 600 references are quoted and the book is well indexed.


Biography always enlivens research reviews and this special edition of the Israel Journal of Botany provides just this appealing combination with a short biography and review of the pioneering work of Michael Evenari (1904-1989) into the germination and eco-physiology of desert plants, coupled with a selection of papers by contemporary workers on germination physiology and desert ecology. Few scientists have been able to contribute with originality to a field as complex as germination over a period of almost 50 years and this opportunity to have a concise summary of Michael Evenari's long and active research life is particularly valuable. Evenari's breadth of interest and powers of observation have made him an author that will be read with profit for many years to come. Apart from his scientific research papers, his historically imaginative and ecologically challenging reconstruction of the 2000-year-old agricultural methods of the Nabateans in the farms at Avdat and Shivta will always remain both a model lesson in agricultural feasibility and a milestone in desert eco-physiology (see the book The Negev: The Challenge of a Desert and his own biography Und die Wüste trage Frucht).

The seven papers that follow in the germination physiology section reflect the inspiration that Evenari gave to the study of seed physiology and, in particular, to the mysteries of the transition from dormancy to germination. Among these Nola and Taylorson examine experimentally the ultrastructural changes in radicles of barnyardgrass in response to treatments with different alcohols both before and during germination. By examining the effect of an alcohol-maintained dormancy (iso-propanol) and an alcohol-relieved dormancy (n-propanol), they note that the digestion and fusion of protein is impaired when dormancy is maintained. Corinneau, Bagnioland and Come look again at the enzymes of sunflower seed dormancy with its seed coat-imposed dormancy above 25 °C and embryo-imposed dormancy below 25 °C.

The ecological section of eleven papers includes the results of Otto Lange's 23 years of measurements into the rates of growth of desert lichens which began in 1964 and continued to 1987. These studies suggest that one of the oldest 'individual' organisms in the Central Negev Desert are the large specimens of Caloplaca aurantiia which are
reported as having an estimated age of about 500 years. The curious phenomenon of ‘hydraulic lift’ (water efflux from the root system in the upper dry soil layers at night) is considered by Martyn Caldwell as providing an opportunity for parasitism by roots of neighboring plants. This paper suggests that, for shrubs such as Artemisia tridentata, hydraulic lift provides water for the maintenance of active roots in the upper drier soil layers while at the same time providing a significant source of water for surface rooting grasses such as Agropyron desertorum.

Other papers discuss such subjects as competition in desert annuals and variability in ephemeral plants. There is also a critical review by Barbour and Minnick of the widely accepted notion that similar climates support similar vegetation. They argue that the degree of convergence between the chaparral of 5 continents is superficial and that detailed examination of physiognomy, leaf and life-form spectra, etc. show much variation. They therefore refute the traditional linkage of chaparral vegetation with Mediterranean-type climate, at least in North America where chaparral extends beyond the limits of Mediterranean climatic areas.

The volume concludes with rather a spine-chilling review of the prospects for change, both climatic, demographic and ecological in the Mediterranean Basin from the Caspian Sea to the Atlantic Ocean. According to the author, Henri Le Houërou, the human population here may reach anywhere between 800 and 2000 million by the year 2050. Already the impact of anthropogenic pressure and its consequences for deforestation, desertification and erosion are being felt in its northern region. This mixture of physiology, ecology and concern for the well-being of arid lands makes this volume a very fitting tribute to a remarkable man and a pioneering ecologist and deserves a place in the library of anyone concerned with desert vegetation.

R. M. M. Crawford

REFERENCES


Over the last decade or two, reviews of the mechanisms of inheritance have been mainly concerned with population biology and the remarkable developments in molecular genetics. This book is particularly welcome because it reminds us that it is the biology of the chromosome that forms the essential link between the underlying molecular events and the consequences for the population. Moreover, while molecular processes within the hereditary material determine some chromosome activities, the behaviour of the chromosome as an organelle within the dividing cell can in return have a controlling influence on how, or even if, the molecular information is transmitted. As appropriate for a contribution to a series on Developmental and Cell Biology, this book sets out to emphasize the modes, mechanisms and modifications of meiosis as a cellular process. It is less concerned with the generational consequences of meiosis and its significance in relation to breeding system, adaptation, karyotype evolution and speciation. This approach is reflected in the Chapter titles:

1. Introduction – multiplication and division
2. Modes of meiosis
3. Occurrence and timing of meiosis
4. Events and mechanisms of meiosis
5. Chromosome disjunction
6. The genetic control of meiosis
7. Sequences and consequences of meiosis
8. Evolutionary aspects of meiosis.

Under these headings are covered all the major aspects of meiotic chromosome activity including pairing, chiasmata and other non-reciprocal forms of exchange, gene conversion, recombination nodules, chiasma terminalization, chromosome segregation and other movements, mutant meiosis and sex chromosome behaviour, together with apomixis in which meiosis is modified or eliminated.

Meiosis is an epigenetic event which occurs only once in the life-cycle of a eukaryotic organism but latent within every cell is the capacity to orchestrate what is perhaps the most remarkable performance in its repertoire, a complex integration of molecular, organelar and cellular activities. There have been striking developments in linking the ultrastructural and biochemical processes to the mechanical events since the last comparable review, by the same author in conjunction with K. R. Lewis, in 1966. Dr. John has now critically reviewed the major developments up to 1988, pointing out that while they have helped us to better formulate the questions about the fundamental mechanisms and evolutionary development of meiosis, they have not yet provided the answers. The coverage is broad, and events at all levels of organization in a wide range of organisms are included. By summarizing and collating information from over 800 research papers and books, John has provided a much needed introduction for advanced students who are new to the subject and an easily accessible insight into our current understanding for those of us who wish to remain in touch with recent developments. Many of the meiotic mechanisms described are remarkable, none more so than the interspecific hybrid fish Poeciliopsis monacha-lucida which exists only as females living with the paternal species P. lucida. The hybrids eliminate the entire paternal chromosome complement just before a modified meiosis during oogenesis. The result is eggs containing only the P. monacha genome. Each generation then requires a new hybrid mating, using the paternal genome simply to trigger and complete somatic development. Equally remarkable are the parallels between plants and animals; chromosome doubling preceding a regular meiosis, in which sister chromosomes pair to form 'autobivalents', occurs in the hybrid apomictic life-cycles of an Australian grasshopper, an earthworm, a fish, an onion and several ferns.

This book has the familiar hallmarks of John's earlier texts. In addition to the apposite quotations at the start of each chapter, the text is well organized and clearly expressed. There is further evidence of meticulous preparation in the unusually low number of typographical errors; the appearance of three different spellings of Drosophila mangaberei on pp. 287–288 is entirely atypical. The text is supported by many informative tables and figures and high-quality photographs of chromosomes. Errors and confusions in the diagrams are few but, in
Figure 1.7, a complicated diagram is made more confusing by an accidentally reversed arrow which makes the zygote the product rather than the progenitor of the diplophase. In Figure 7.1, the diagram does not unambiguously illustrate the statements in the legend regarding centromere position and recombination. The cross-referencing between chapters is frequently helpful but occasionally unnecessarily laborious. A definition of the technical term ‘thelytokous gynogenesis’ when it was first used (p. 281) would have been more useful than a reference to a later section where the two words are defined separately several pages apart. There is a very serviceable general index which includes a species index scattered throughout under group headings such as ‘insects’, ‘mammals’, ‘Amphibia’, ‘Drosophila’, ‘angiosperms’ and ‘Bryophyta’. This arrangement has its advantages but it does depend on knowing what group to look under if a long search is to be avoided. A zoological reader would need to know that Minium is a bryophyte; a botanist would need to know that Otocryptops is a chilopod.

The emphasis throughout is zoological. This is largely a reflection of the remarkable diversity of meiotic processes discovered within the animal kingdom and the intensity with which they have been studied, often using technically very sophisticated new techniques. Plants are featured in a supporting role in several places and sometimes make a unique contribution. For example, there is a very good account of what is known about the control of homoeologous pairing in wheat by the $\Phi l$ gene. However, there are also occasional indications of a lack of familiarity with plants that might reflect the author’s own zoological interests and experience. For example, ferns as usually defined are not all homosporous and their gametophytes do not develop within sporophyte structures (p. 10). Similarly, use of the term ‘ovule nucleus’ for the female gamete of angiosperms (p. 11) is likely to mislead anyone new to the distinctions between ovary, ovule, embryo-sac and egg. Of more significance is the incorrect impression given of apomixis in plants. Plants come close to matching the diversity of animals in this respect and there are some features which are unique to plants but this is not reflected in the comparatively brief treatment here. Furthermore, there are statements which could lead to misunderstandings by those unfamiliar with plant life cycles. Table 7.10, which implies that gametophytic apomixis consists only of diplospory or apospory, is followed by the statement that it is diplospory in plants that equates most directly with parthenogenesis in animals (p. 298). This is misleading. Parthenogenesis also occurs in plants and recurrent gametophytic apomixis must consist of not only diplospory or apospory, to produce unreduced gametophytes, but also apogamy or parthenogenesis to produce sporophytes without fertilization. Both meiosis and fertilization must be modified or circumvented to achieve a recurrent apomictic cycle whether in an animal or a plant. This is revealed clearly in the majority of plants where there is intervening multicellular development but is sometimes overlooked in animals where the two events are consecutive or even simultaneous in the same cell.

Botanists should not be deterred by these criticisms. Every plant scientist with an interest in chromosomes should read the book, not despite the emphasis on animals but because of it. It won’t always be easy; there is an uncompromising section on parthenogenesis which will require concentration from anyone unfamiliar with, for example, the distinction between ‘diploid arrhenotoky’, and ‘agonoid thelytoky’. In the process, however, a botanist is certain to be impressed both by the underlying uniformity of meiosis across the two kingdoms and by the diversity of the component intricacies. Awareness of the diverse modifications of animal meiosis might stimulate studies that will reveal new meiotic mechanisms in plants.

A. F. Dyer


When reviewing previous books on nitrogen fixation, aimed at undergraduates to new research workers, the underlying question has often been ‘is it as good as Sprent?’; a reference to The Biology of Nitrogen-fixing Organisms by J. I. Sprent, published in 1979. This book is an update, and expansion, of that work so the pertinent question is whether the standard has been maintained. The short answer must be yes.

The book provides both an overview of nitrogen fixation, from agricultural and ecological aspects, and a more detailed analysis from a structural/physiological viewpoint. As such it avoids excessive duplication of the more biochemistry/genetics-biased Gallon and Chaplin book (An Introduction to Nitrogen Fixation, Cassell, London, 1987) whilst still providing adequate coverage of the important biochemical features. It can, therefore, be considered as a companion to that book rather than a competitor. Certainly, the subject of nitrogen fixation, even at the introductory level, is broad enough to require coverage by more than one book.

The book begins with a survey of the range of nitrogen-fixing organisms, accompanied by simple, clear diagrams and extensive tables which represent invaluable reference material. However, the quality of reproduction of some photographs could have been better. In the chapter on legume and non-legume nodules, it was refreshing to see the genetics of nodulation being treated as an integrated aspect of this process, rather than either accorded the status of a study in its own right or added on as an afterthought.

The chapter on nitrogen fixation in agriculture provides an excellent background and reference source for this extensive area of research, whilst those on nitrogen fixation in forestry, aquatic ecosystems and terrestrial ecosystems will open up new vistas for many readers. They also underline the importance of nitrogen fixation to any consideration of nitrogen in the environment.

The final chapter on evolution and the future seems to assume a greater familiarity with the subject on the part of the reader, possibly because the authors had to condense their material at this stage. However, the science and ideas are fascinating and well worth any extra effort. The Appendix on techniques for measuring nitrogen fixation should also be read as a very useful introduction to this ‘minefield’ of an area and the reader can savour the authors’ delightful understatement that ‘Measurement of nitrogen fixation, particularly in the field, is not easy’.

Throughout, the book is clearly written with a plethora of references to the latest publications. The authors are
also quite prepared to admit where there are areas of uncertainty and make no attempt to present the subject as simply a series of unquestionable facts. I congratulate them on this work and strongly recommend this book.

F. MINCHIN


The science of plant disease epidemiology has developed rapidly in recent years as it has absorbed more advanced methods of monitoring, data analysis, modelling and computer technology. Campbell and Madden take full account of this progress in presenting a very useful foundation text on the subject. Following a historical review of the occurrence of important plant disease epidemics, the early part of the volume is concerned with monitoring equipment and methods applicable to the host, environment, pathogen and disease. Methods of analysis and modelling and their application are then considered and later chapters devoted to simulation models, experimental design and sampling, crop loss assessment and disease forecasting. Some allowance is made for a varying background and depth of interest in the readership. For example, an appraisal of methods of studying epidemics through the construction of disease progress curves, when certain simplifying assumptions are made, is given, but leads into a more advanced treatment of temporal analysis. In dealing with spatial analysis of disease outbreaks, short- and long-range dispersal of inoculum and disease gradients are examined and, also, the analysis of spatial pattern, an area in which research interest has intensified only recently. Throughout the book, illustrative case studies of specific diseases encompass a broad spectrum of behaviour associated with different pathogen groups, their life-cycles and transmission characteristics, although a possibly general deficiency is the lack of attention given to seed-borne transmission. The content is well integrated, fluently expressed and supported by full and up-to-date lists of suggested reading and references. There are occasional typographical errors and in Chapter 7, which is largely intended for those less familiar with data analysis and modelling, some practical exercises might have been brought in with advantage to help the student's understanding. However, these are small criticisms to set against the generally high standard of the work. The literature has been extensively researched and the authors have produced a scholarly exposition of the principles of plant disease epidemiology. They have also furnished the reader with a well-balanced insight into the practical application of studies on plant disease epidemics. Plant disease epidemiology has its origins in an empirical approach which has contributed much to an understanding of the interaction of factors leading to crop disease epidemics and to the development of successful strategies of disease control. Due recognition to this is given by Campbell and Madden who also convey in a realistic manner the potential offered by more sophisticated methodologies to produce improved ways of quantifying and improved means of describing and interpreting the complexity of interactions underlying changes in disease intensities. This book provides a valuable preparation to the objective study of plant disease epidemics based on sound experimental practice and using modern research techniques.

J. H. LENNARD


This book gives a comprehensive account of the properties, processing and uses of British-grown timber. It is intended to provide a broad coverage of this subject area for a wide readership – woodland owners, timber growers and merchants, operators, managers and students – and is therefore written in a concise, straight-forward style which combines accuracy and clarity. Reference to specialist literature is made regularly throughout the text, and in a Bibliography, and each topic is well illustrated with drawings, diagrams and photographs.

There are 15 short chapters, which are not always grouped in a logical order. Six refer to different uses of wood – roundwood, sawn timber, fencing, firewood and charcoal, non-timber products (including wood gas) and processing residues, and panel products. Four are concerned with various aspects of timber processing – log grading and sawmilling, timber defects and grading, timber drying and preservation, and protection from pests and pathogens. Three describe timber properties, with paragraphs on each of the major softwood and hardwood species, and a separate chapter deals with wood structure and chemistry and their implications for pulp production. The introduction gives a useful overview of the British timber resource, with brief descriptions of harvesting systems and the effect of silvicultural practice on timber properties, while the final chapter presents the main organizations dealing with timber marketing, processing and research.

This is an eminently practical guide and reference book, incorporating recent research results and international grading standards (for example) with a wealth of practitioner experience. Modestly priced, it represents excellent value for money and it fills a gap in British forestry literature at an important time for the industry as developments progress towards a single European market with both greater competition and greater opportunities.

J. BLYTH


In his Preface, Professor Tomlinson writes 'I have called the book "The Structural Biology of Palms" to indicate its intent. Perhaps "functional morphology" would be a better term...'. His theme certainly is functional morphology but he was right to choose the more adventurous
title, for this is an adventurous book. It is nothing less than an attempt, and a remarkably successful attempt, to explain the whole relationship of form and function in the palm plant: not in an isolated exemplar of palms but in the whole family. This family (Palmae or Arecales) is so well-marked, palm is such a familiar English word, that one can easily forget its great diversity.

Readers of this book will, I imagine, fall into two main classes: those who are already students of Palmae and those who have no more than a nodding acquaintance with palms in general but are caught by the idea of structural biology. The former will know what to expect from Professor Tomlinson and will sit down happily to read from page 1. If the latter wish to get the flavour of the book before settling to a major reading session, I suggest they turn to the section on the leaf-base (pp. 233–241). The strains and stresses to which it is subjected, both by the weight and movement of the leaf that it supports and the growth of the stem on which it is borne, are described with striking lucidity and the varied ways in which these are overcome bring out forcibly the remarkable diversity to be found within Palmae. With opened eyes, the reader will find that a walk through the palm collection of any botanic garden will be a new experience, even if he concentrates on this one feature alone.

A general ‘Introduction’ to palms (pp. 1–38) is followed by a chapter entitled ‘Phasic Development’, which sets out the various phases of palm growth: embryo, seedling, establishment phase, mature vegetative phase and mature reproductive phase. Least familiar is the establishment phase, which sees, in most palms, the increase in diameter of the axis without much elongation; only when full diameter has been reached does elongation take place, resulting in the characteristic straight palm stem. The pattern of development is, of course, occasioned by the lack of secondary thickening in palms. Those palms which show an early elongation of the axis before it attains its maximum width are inevitably weak stemmed at the base and are dependent on the development of stilt roots for stability.

These phases of development, and their associated anatomy, account for twelve chapters. There follows a brief one on the palm’s defences, both physical (by development of spines of differing morphological origins) and chemical (largely by cell inclusions such as starch and raphides rather than by toxic substances).

Finally a cautious chapter deals with the relationships of the palms and with their significance in considering the origin of the monocotyledons as a whole. Professor Tomlinson is not given to grand speculations but one can wholeheartedly endorse his view that it is essential that we divest ourselves of the dicotyledon-centred viewpoint in thinking about the monocotyledons. It also follows from this last chapter that we must rid ourselves of a florally centred approach: the fundamental differences between the monocotyledons and dicotyledons are in the structural organization of the vegetative plant body.

Nearly all books have a few printing errors, which a reviewer can pass in silence. Unhappily, the inauspicious start made in this one (circumsection instead of circumscription on line 4 of Contents) is never retrieved. Apart from an excessive number of trivial mistakes, ranging from mere literal transpositions to singular subjects with plural verbs, and vice versa, and impossible punctuation (my copy now has some 50 marginal corrections), there are one or two tiresome enough to cause at least momentary confusion: on p. 329, line 3 from bottom, the first bisexual should be unisexual; on p. 239, last paragraph, the references to Fig. 16.2C and 16.2D should be to Fig. 15.2C and D; on p. 356, last line of first paragraph under Nectaries, the word ovule should be ovary; the statement (p. 331) that the plural of acervulus is acervulii will make Latinists shudder and unfortunately that form (instead of acervuli) is used elsewhere; finally, the subject of Fig. 2.8A is Juania not huania.

These blemishes are unfortunate but they are no more than blemishes. This is a botanically stimulating book; no one should pass it by with the thought ‘I’m not really interested in palms.’ The book is about palms; the theme is the structural biology of plants. It needs to be widely read.

B. L. BURTT


This large, well-illustrated book, seemingly only the third to be devoted entirely to the intriguing plants of the title, is effectively a review of all that is currently known or surmised about the seventeen angiosperm genera so far known to exhibit a degree of carnivory (largely insectivory). It is a scholarly academic treatise, unsparing of space to reveal the authors’ great knowledge of, and evident high regard for their subjects. Part One covers the Syndrome and the Habitat, Part Two deals with Attraction and Trapping, while Part Three is concerned, for a hundred pages, with Nutrition and Digestion. Three smaller Parts follow, on Phytochemical Aspects, Exploitation and Mutualism, and Evolution. This mechanistic organisation of material is sensible, though the authors’ assertion – that this is partly ‘because there has only been a limited advance in the taxonomy of the phylegenetic relationships of the various groups since Lloyd’s time’ (1942) – seems a good deal less so.

The book adds up to a comprehensive biology of carnivory in plants, with up-to-date facts, informed evaluations and speculations about morphological and physiological adaptations, and how they may have originated. There are no great surprises.

I believe, as the authors indicate, that a long time was spent in assembling the components of this mighty volume. This lengthy period, plus the diversity inherent in a multi-author approach, perhaps explains some of the unevenness of style. In parts the writing is elegant, in others precious, in others turgid and occasionally tortuous. This does not matter of course, if the meaning is eventually clear, as it mostly is. However, in a book which is primarily scientific in purpose, it is unfortunate. If it were possible for a mere book to be self-consciously beautiful and a little pleased with itself, this would be it. Certainly it is an important, welcome summary and, I am convinced, an accurate one, but it is so dominantly discursive at times as to make one wringe. There are numerous oratorical decorations that would have been better employed solely in the doctors’ lectures.

A more critical and systematic editorial policy would
have made the book significantly shorter, clearer and cheaper - hence better. Good poets don't waste words.

P. M. SMITH

The Evolution and Classification of Flowering Plants.

This second edition of a famous text-book of angiosperm evolution and classification brings into the reach of everyone's library - poor British students included, so modest is the price - the accumulated wisdom and insights of a very experienced systematist. As in the first edition, the reader is faced on almost every page with provocation, stimulation, carefully weighed argument, fair comment, reminders, new thoughts - all in a clear, attractive style. The present edition includes the development of the Cronquistian general system which he has published since the first edition (1968) began its clarifying and synthesizing role in systematic thought and teaching. For instance, the Zingiberidae made their bow as a Cronquistian subclass in 1978. There are additional chapters on evolutionary mechanisms and on taxonomic methods and ideas, so that the book is even more useful than before.

Cronquist, Takhtajan, Stebbins and Dahlgren are the modern titans in this field. Any botanist worth the name needs to read everything they have written. Such is the importance of this second edition, for another generation of students, teachers and researchers.

So distinguished a student of the evolutionary spoor of plants will expect to have his own intellectual trail around punctuated equilibria, adaptive radiation and cladistics sniffed at very carefully. Sadly, only a whiff of it is detectable in this volume but there are references to his earlier, more detailed discussions. The taxonomic scale on which punctuated equilibria have usually been discussed has blighted the notion for those who practise as plant taxonomists rather than seekers of that Holy Grail 'Nothing But the Truth'. Though the ideas can scarcely be said to have been undersold generally, there has not been effective market research in the taxonomic area. Not surprisingly therefore, though Cronquist is characteristically charitable in his remarks, he is clearly unpersuaded. On cladistics, he adheres to the sensible view (i.e. mine) that, where resources permit, with the discipline they involve, cladistic analyses can be a useful early or middle endeavour in an evolutionary study. They do not, cannot comprise an entire, complete evolutionary investigation. And the taxonomic consequences, even with some of the changed club rules in play, are too likely to be abstractions. Plant taxonomists, it is true, are psychologically disinclined to fly by wire, preferring glutetus maximus, but they have more immediate, more demanding, more diverse, more hard-bitten customers than other biological workers. We may, with Bunthorne, long for whirlwinds, but meantime we do what we can with the bellows.

I could write a book about this book, but finish now by calling attention to one feature which lends dynamism to Cronquistian prose - the one-liners. Especially those that one agrees with, and can read, if not between, both above and below the line. 'Taxonomy is not Physics'; 'My gut reaction - Gondwanaland'. Let us have more, much more. What an excellent, cheap classic! All chemists, physicists, zoologists and mathematicians as well as botanists, should be required to read, learn and inwardly digest.

P. M. SMITH


These maps were first published as separate volumes by Societas Biologica Fenica Vamano, Helsinki, having been produced by an international editorial committee, the Committee for Mapping the Flora of Europe. The Flora Europaea organization formed one basis for this important collaboration, and the present compendium edition of the maps matches the format of Flora Europaea. The original pagination, applying to the parts previously published separately, is rather confusingly maintained, but the clear numbering of the maps and the excellent Index should overcome any problem very quickly.

The Committee, collaborators, advisers, publishers and editors are to be congratulated on a fine piece of work, as are the Finnish authorities who had the imagination to support it financially. The maps - of course imperfect, incomplete as yet, but nonetheless extremely helpful to students of plant distribution - show records in 50 km squares, of which there are 4400 in Europe. The final scale, as printed, is 1:3100000. Among the information conveyed by symbols on the maps is presumed native status, age and degree of certainty of the record.

Maps are either of the whole of Europe, or of part of it, as the distribution demands. All the maps are clear. There is a brief textual summary, sometimes with a taxonomic or phytogeographical note, for most species and for a fair number of subspecies. The quality of production of these first three volumes is in all ways good, and the price not exorbitant: we look forward to the appearance of the rest.

In his interesting General Preface, D. A. Webb, an adviser, expresses fair appreciation for what has been achieved, comments on the inevitable limitations of the record so early in this phase of European collaboration, and is amusingly astonished at the currently low general awareness among botanists of matters of political geography. It's the times that's in it: we live in a period of educational decay.

P. M. SMITH


This handy and attractive book, in stiff paper-back, is the first to provide a flora of the Republic of Singapore. It
deals with the gymnosperms (8 species) and dicotyledons (1285 species), to which over 500 introduced species are added: that on monocotyledons is promised. Hitherto the territory has been incorporated in floristic works on the Malay Peninsula and the richness of the island flora reflects that of the whole. Though now largely deforested and devastated botanically through the Japanese conquest and urban expansion, the centre of the island still holds a large area of more or less disturbed forest that is intriguing for the botanist.

It is not a book, however, for the beginner or amateur in spite of the copious line-drawings, four to a page, dispersed through the text. The approach is disciplinary and intended, rather, for the serious student; it will supply a long-felt need in college teaching. Keys to identification require mainly floral dissection. That to families is placed at the end; those to genera are under the family headings in the general text. Specific keys are provided where the species of a genus are few; otherwise the student is referred to more general floristic works, especially in the case of trees. This saves space and that has always been the overriding problem in efforts to present in one sizable cover so rich a flora. The serious student will need more of a library. There are no short cuts and this will be particularly baffling in the case of trees and lianes with flowers high out of reach. Genera and species are arranged alphabetically in the families but the families are arranged in the order adopted by the author in his earlier work of 1983. There will be constant and distracting reference to the index.

The print is good. The illustrations are clear if, in some cases, rather too small for satisfactory detail. Misprints are avoided. The text is thorough, as one would expect from the learned author who has devoted so many years of teaching and retirement to this commendable achievement. The cover is heavenly blue embellished with a startling arillate fruit in red, pink, white and pale green, the clue to which is on the back-cover. We were led to hope for a durianological theme, for the subject was born in Singapore, but biology is largely eschewed. Some plants, recently extinct in the island, have been included but there are others which disappeared last century, even so recently as the present generation. Thus, the work is not a total flora of Singapore but a guide to what is and may still be found. Herein lies its great value. The student who masters it must help the many who roam and run the countryside to appreciate the heritage. Singapore has not only a Golden Mile but a botanical heart to treasure.

E. J. H. CORNER


Updating the Supplements to Index Kewensis, Kew Index makes its third, annual appearance, recording new or changed names (families downwards) of seed bearing plants on the Kew register up to December 1988. New and overlooked generic names, and an appendix of names of ferns and fern allies are additional features. The foreword (by G. T. Prance) is more useful than forewords usually are. One hopes that the new elements of it will always figure in future editions, of which there must be an indefinitely large number, such is the size of the taxonomic task. Those ignorant of taxonomy and its purposes but too busy to read about what it is or what it is for, might scan these pages, and reflect a little. Perhaps my poor, misunderstood craft, or sullen art, would be well served if, like British Telecom, we all proposed making a charge for every directory enquiry, or even stopped publishing our 'phone book'.

P. M. SMITH


This well-produced book is by Dr Maurice Reille who is one of the skilled pollen analysts, very active during the last 20 years, in the group of palaeoecologists in the Laboratoire de Botanique Historique et Palynologie in the Université d'Aix-Marseille III. The team is led by Professor Armand Pons who wrote the preface as well as the final, 11-page, chapter on pollen analysis and the quantitative reconstruction of climate.

It is Professor Pons who states the purpose of the book. He is convinced that the book is a precious work of reference for all colleagues wishing to prepare a teaching course for undergraduate and postgraduate students and for secondary school pupils.

Chapter A of 36 pages is an introduction to the study of pollen morphology and Chapter B of 8 pages concerns pollen morphology and systematics with exclusive relevance to the genus Cistus. Half of chapter A and the same of chapter B consists of illustrations. The very high quality of the photomicrographs, stereoscans and interpretative diagrams alone justifies the purchase of this book by every palynological laboratory. However, this is a very French book, the greater part of which has little interest for university and school teachers outside France, certainly not for the preparation of elementary courses. Chapter C of six pages concerns the relations between pollen rain and vegetation and uses exclusively Corsican examples. Chapter D of 31 pages is an introduction to pollen analysis and uses examples from southeastern France (Pyrenees to the Alps). Chapter E of 61 pages deals with some examples of Postglacial diagrams and the understanding of present vegetation; the areas discussed are Corsica, Massif Central, Vosges, Jura, Granada, Tunisia and Morocco. Chapter F of seven pages concerns the pollen diagram as a complementary instrument to absolute dating.

There is a one page discussion of pollen sample preparation and a one page tabulation of the place of man in chronology. There is no index. Of the approximately 80 references in the main bibliography, a large proportion are papers by the author and his colleagues. The short list of general works has a more international spread. This book is in no way a guide to pollen work in the regions with which it deals. One example can be given; none of the high quality papers by C. R. Janssen and collaborators on the Massif Central and the Vosges is even listed, let alone discussed.

J. H. DICKSON
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