

criticism or making any correlations—with so enormous a task before them already they could hardly be asked for even more effort. The reader should therefore discount references to chromones in sebum (p. 466) that, when the paper is read, turn out to be imaginary, to reaction pathways that a student could better (p. 760), to a rather wild biosynthetic speculation (p. 459—your reviewer regrets that he was the originator), and so on. If it is in the literature and is not definitely wrong, then it is almost certainly in this book.

The style is clear and so are the diagrams, formulae, and tables, and the incidence of typographical and similar errors is low for a work of these dimensions. It is a little odd that, with so much to do, the authors sometimes add totally useless information, e.g. an R_f value of no obvious interest and, with no solvent or supporting phase mentioned, no significance (p. 468). More worrying is a sprinkling of scientifically inaccurate statements; examples: a 'thermal Simonis' reaction (p. 469), a confusion between pK_A and pK_B (p. 560–561), DDQ reductions (section heading p. 61), reaction with methyl lithium in the presence of perchloric acid (p. 719). And a very short section on p. 667 that starts by stating—correctly—

that alkaline hydrolysis opens the pyrone ring of chromones, and finishes by stating that it does not. The use of the term 'dehydrating agent' for a Friedel–Crafts catalyst (p. 227) seems antiquated nowadays, while the separation of Friedel–Crafts cyclisations of acids from that of their esters (p. 236) results in unnecessary repetition.

Having now established my credentials as a reviewer by carping in the traditional manner, let me say that in this volume is condensed an immense and important literature that previously was almost without access routes. What faults there are are greatly outweighed by the merits; I have used this book with advantage almost every working day for the last three months. Those interested in this field of chemistry owe a considerable debt to Dr. G. P. Ellis, who wrote more than half the book himself besides editing it, and to his three colleagues: I. M. Lockhart, Deborah Keeder-Nycz and E. E. Schweizer.

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Flowering Plants—Evolution and Classification of Higher Categories: edited by K. KUBITZKI. Springer, Vienna, 1977. 416 pp. DM 198 (approx. £50).

This publication stems from a symposium held in Hamburg in September 1976 and contains 23 review papers dealing with the problems of arranging angiosperm families into a system of classification which expresses evolutionary relationships. Indeed, a number of such systems exist—notably those of Cronquist & Takhtajan—but, as is pointed out here, the evidence upon which such systems have been erected is often suspect. V. H. Heywood, in a brilliant iconoclastic opening address, makes this abundantly clear. He points out, for example, the dangers of using morphological features, e.g. those of the so-called primitive flower, for constructing such systems. As he says "the difficulty about all these ingenious (or, in some cases, ingenuous) theories is that there is no way they can be tested, short of finding actual fossils for confirmation and what is more, they have fed on each other to such an extent that the body of apparent evidence is so impressive that it is difficult at times to remember there is no factual basis for it beyond the present day starting point and general trends in the fossil record".

Having started in this salutary manner, the remaining contributors in the book are concerned with picking up some of the pieces and, at least, justifying parts of the present system of classification based on critical, modern experimental approaches. K. R. Sporne, for example, argues from character correlations for some kind of evolutionary system and points out that it is possible to find 122 positive correlations among dicotyledons between 26 morphological, anatomical and biochemical characters. All these characters can be regarded as primitive, from their abundance in families

known from fossil records to be very early in origin. Biochemical data on their own, of course, provide a line of independent evidence which on biosynthetic arguments, can be tested against phylogenetic trees derived from morphology or anatomy. In a challenging chapter, O. R. Gottlieb describes some new ways of presenting alkaloidal, isoflavonoid and furanocoumarin data in the form of three dimensional diagrams that can be used directly by taxonomists. Unfortunately, the ascertainment of these biochemical features is still limited and the use of such data is restricted at present to rather small groups of plants, i.e. to parts of the Leguminosae, the Apocynaceae, Amaryllidaceae and Umbelliferae. In another important paper, H. T. Clifford describes the numerical approach to classification, as applied to the monocotyledons. By using 51 attributes, he is able to sort 88 liliat families into 4 major clusters, two of which correspond to traditional groupings. The other two clusters differ from any recognized groupings but each shows a strong internal homogeneity in containing either mainly wind-pollinated or mainly insect-pollinated families. While the distinction between monocot and dicot families would seem, to some, to be one of the few really clear-cut divisions in the angiosperms, H. Huber in a later paper indicates that this apparent difference is to some extent illusory and that the primary separation of plant families based on cotyledon number masks a whole range of other features which unites mono and dicots. Indeed the monocots are so intimately related to ranalean dicots that the author argues for placing them together in a single super order.

The only chapter in the book dealing with a specific phytochemical character is that of R. Hegnauer who presents a masterly account of cyanogenic compounds as systematic markers in plants. However, the distri-

bution of iridoids, tannins and alkaloids is considered *en passant* in a chapter by R. Dahlgren entitled 'Contribution on the diagrammatic presentation of the angiosperms in relation to the distribution of character states'. While Dahlgren's now well-known balloon-like phylogenetic shrub can be criticized on a number of grounds, it does represent a considerable advance over the old-style phylogenetic tree. It is at least extremely valuable to phytochemists since it will tell them at a glance whether the distribution of any new character they find is of any systematic significance or not. Chemical characters are also considered by R. F. Thorne in a highly interesting and thought-provoking chapter 'Some realignments in the Angiospermae'. Certainly one can take issue with a number of judgements made here, but this author refers to a whole series of unsolved taxonomic problems which would be worthy of attention from phytochemists.

Space prevents an outline of the many other interesting contributions to this fascinating symposium volume. It is highly unusual to find taxonomists willing to discuss at length their faults, frustrations, and failures and to all phytochemists who have naively accepted that the Cronquist-Takhtajan Concordiat represents the last word on angiosperm classification this volume is a must. Unlike many symposia proceedings, this one I am sure is of lasting value and it will be worth re-reading in five, ten or fifty years time. It is the first time that such a talented group of plant scientists have ever been brought together to discourse to such purpose on angiosperm classification from so many different viewpoints. It thus represents a unique contribution to modern plant systematics and deserves to be widely read.

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Biochemistry of the Cell Nucleus: edited by P. B. GARLAND and A. P. MATHIAS. Biochemical Society Symposium Number 42, 244 pp., 1977, £15.00.

The papers in this Symposium Volume cover many aspects of the structure and function of the cell nucleus, although as is perhaps inevitable in such a wide-ranging topic coverage is uneven. Thus there are four chapters on deoxyribonucleic acid polymerases and only one on chromatin structure. Four chapters on deoxyribonucleic acid polymerases are followed by chapters on DNA-dependent RNA polymerases, messenger RNA synthesis, processing and regulation, and post-synthetic modifications of nuclear macromolecules. There are chapters on chromatin structure, structure and function of nuclear membranes, non-histone chromosomal proteins and 45S RNA. The last two chapters deal with injected amphibian oocytes and gene transcription, and

mitosis and microtubule assembly.

Although there is an emphasis on enzymology, recent developments in structural and cytological aspects are also well covered. Most authors have opted for a critical review, indicating clearly where they feel there are deficiencies in knowledge and the way in which further progress is most likely to come. As they are all leading researchers in their particular fields, this makes for interesting reading, but documentation is by no means encyclopaedic.

This is another well written and attractively produced book in the Biochemical Society Symposium series. It can be recommended not only to researchers in the fields covered, but also to anyone who wishes to have a critical assessment of the important developments in these areas.

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