

## BOOK REVIEWS

**Phytochemical Methods:** by J. B. HARBORNE, Chapman and Hall Ltd. 1973. 278 pp. £4.80.

EVER since the seven-volume work of Paech and Tracey appeared during the years 1956 to 1964, no laboratory handbook on phytochemical methods has been published. The techniques of plant analysis have, however, received a strong impetus and have developed extensively. J. B. Harborne, author and editor of several books and articles on plant constituents, has undertaken single-handed the attempt to write an introductory book on this subject. This book provides an outline and summary of the methods available today for analysing plants for their organic constituents. The book is primarily intended for students of botany, biochemistry, pharmacognosy, natural products chemistry and food chemistry. In addition this book serves the purpose of the plant physiologist, pathologist, ecologist, paleobotanist, plant geneticist and students of plant systematics who have hitherto not enlisted phytochemical methods for the solution of their research problems.

After a general introduction to the various phytochemical techniques starting from extraction methods to the application of modern spectroscopic methods, there follow individual chapters on separate classes of compounds. They are classified according to biosynthetic origin, solubility properties and the presence of certain key functional groups: phenolic compounds including the quinone pigments; terpenoids; organic acids, lipids and related compounds; nitrogen compounds (amino acids, amines, alkaloids, cyanogenic glycosides, indoles, purines, pyrimidines, cytokinins and chlorophyll); carbohydrates and their derivatives; and macromolecules, i.e. nucleic acids, proteins and polysaccharides.

Each chapter begins with a broad introduction into the definition, functions and the general chemical characteristics of the class of compound. A short review of the chemistry and occurrence of each corresponding compound type in the Plant Kingdom then follows. Subsequently the reliable chromatographic, spectroscopic, detection and screening methods have been dealt with. Most of the chapters end with some representative examples of isolation procedures which could be adapted in a study course in phytochemistry. Every chapter has a general reference section with a bibliographic guide to more advanced texts. Special attention has been paid to the detection of endogenous plant growth regulators and to methods of screening plant substances of pharmacological interest.

Limited by size considerations, the author has concentrated on products of higher plants. Topics such as antibiotics from microorganisms have thus been excluded. The emphasis in the suggested analytical procedures is laid on the chromatographic, UV and IR spectral methods.

The compound types have been dealt with according to their significance with astonishing homogeneity. This is all the more commendable as the research experience of the author does not cover all of the compound classes discussed. It is reasonable that all the varied and individual methods of structure elucidation have not been included. However it should be kept in mind that an exact chemotaxonomic work cannot be achieved by chromatography and colour reactions only. Perhaps in the next edition the individual chapters

could be supplemented by more emphasis on chemical races, chemotaxonomic methods, spot tests, general group reagents for separation of compound types, and procedures for quantitative estimation of the more important groups of compounds.

The book, comprising 278 pages, is excellently equipped with numerous formulae,  $R_f$  and spectral tables, chromatographic schemes and spectra. This book fulfils a genuine need in the field of natural products analysis and should be found in all laboratories engaged in research and teaching connected with the chemistry of plant constituents.

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**Chemistry and Biochemistry of Herbage:** edited by G. W. BUTLER and R. W. BAILEY, Vol. 1, Academic Press, London, 1973. ix + 639 pp. £12.80.

THE AIM of this book, the first of a three volume set, is to bring the latest information on the chemistry and biochemistry of herbage to the attention of the wide range of agricultural scientists who may neither have the 'time, training, or possibly the inclination to keep abreast' of the rapid developments in these disciplines. The book is concerned with the components in the herbage plants utilized by grazing animals and also with the biochemical production of herbage. Even if agricultural scientists were willing to delve into the original literature, or to read the specialized texts, they might find it difficult to discriminate between what is trivial and transient and what is significant. Biological facts are often more temporal than are facts in certain other scientific disciplines. There is a detritus of doubtful or discredited facts, speculations and terminology. The agricultural literature is bespeckled with myths given a degree of respectability by the frequency of their repetition. Some terms still in use are as relevant to science as is the once rightly respected term phlogiston. This book provides an excellent opportunity for the potential readers not only to refurbish, and add to, their knowledge but, and this is very important, to abandon or view more sceptically once useful but now increasingly meaningless terminology.

The editors have assembled an excellent team of contributors to guide the reader along the herbage trail. As good guides they have kept to the track while making concise, interesting and relevant comments on the way. There is abundant information on herbage on which to graze and ruminate. The book is neither an elementary text nor a general text on chemistry and biochemistry; it is, and this is a rare thing, what it sets out to be namely a book designed to assist specialists by those in other disciplines. The various chapters deal selectively, clearly and in considerable depth with amino acids, amines, ureides, proteins, nucleic acids, soluble and insoluble carbohydrates, lignin, plant phenolics, lipids, pigments, alkaloids, sterols, saponins, cyanogenic glycosides, glucosinolates and minerals, and the present volume concludes with a chapter on nutritional aspects of soil ingestion by grazing animals. There is a helpful appendix giving the common and systematic names of herbage plants. The structures of lignins, polysaccharides and proteins in herbage plants are not as simple as commonly assumed and often, but not invariably, the convention of dismissing protein as "crude protein" or "insoluble nitrogen" is inadequate in nutritional studies and the term "insoluble nitrogen" is a rag-bag term for a complex collection of amino acids, peptides, nucleotides, chlorophylls and other classes of compound. Lignin is one of the most complex, and still not fully understood, classes of compound in plants.