

BOOK REVIEWS

Introduction to High Performance Liquid Chromatography, Second Edition, R. J. HAMILTON and P. A. SEWELL. Chapman and Hall Ltd., 11 New Fetter Lane, London EC4 4EE, in association with Methuen Inc., 733 Third Ave., New York, NY 10017. 1982. vii+248 pp. 16 x 24 cm. \$29.95.

High performance liquid chromatography, or HPLC, has rapidly evolved from the stage of being used mostly by chromatographers, to its present status as a routine laboratory instrument widely used by a broad range of researchers needing to solve their own peculiar separation problems. The natural product researcher needing to use HPLC in this manner requires a brief but thorough review of the relevant underlying theory as well as an overview of the current state-of-the-art in instrumentation and column packings. The chemical researcher who is not a specialist in separations science requires a brief volume from which he or she can quickly elicit needed information as the need arises. This newest edition of *High Performance Liquid Chromatography* by Hamilton and Sewell would seem to address this need quite well.

The book is divided into eight chapters. Following a brief introduction to the various modes of HPLC, Chapter 2 delves into the underlying theory of the separation process. The Theory section will probably not suffice for the serious chromatographic researcher, since it is intended more as a review rather than a separate treatise. This section is nevertheless complete, and the authors should be congratulated on a clear presentation of contributions to band spreading, and on the use of reduced parameters, after Giddings. The equations in fact rely quite heavily upon Giddings' now classic book "*Dynamics of Chromatography*". It is unfortunate that consistent SI units were not used throughout, but this is a minor point. The theory of exclusion chromatography is too brief to be of any real use to someone needing to utilize this technique.

Chapter 3 covers the equipment of HPLC with adequate breadth, however there is no real depth to the discussion of any one detector type. For example, LC-MS receives only about a page of coverage, with two references, neglecting much of the exciting work now being accomplished in this area with direct interface microbore HPLC-MS methods. The use of specific and sensitive detectors in HPLC is of paramount interest to natural product chemists, who will probably have to search elsewhere for sufficient information on this topic area.

Chapters 4 and 5 cover stationary and mobile phases in HPLC quite well, as does Chapter 6, on the development of a separation. Once again, in line with the apparent purpose of the book, they are brief, but can form an accurate foundation upon which the researcher can build as necessary.

The final section on Applications is useful if one needs quick access to starting point separation conditions of new compounds and classes of compounds. Any encyclopedic listing of separations has the danger of being quickly outdated, but such listings still serve a useful purpose. Applications mentioned include Pharmaceuticals, including alkaloids, tetracycline antibiotics, tricyclics, and analgesics; Biochemicals covering amino acids, peptides, sugars, prostaglandins, nucleic acid constituents, aflatoxins, and catecholamine metabolites. Other compounds mentioned include various pesticides, polyaromatic hydrocarbons, phenols and dyes. A compound index is included for easy access to this information.

In summary, this is a handy volume to have in the laboratory, to serve as a refresher on basic equations for calculations, and for practical reference for instrumental problems. It is not comprehensive, and the depth will not be fully satisfying for those requiring comprehensive discussion of any one aspect of HPLC. However, such a volume would be too large and complex to be of general interest. Hamilton and Sewell's book will serve well as a reference book for undergraduate level courses in Instrumental Analysis, and as a good introductory text for those chemists who don't wish to become experts in chromatography, but who must use HPLC to accomplish their own goals. It is a clearly written and well-organized volume, and will certainly form a useful addition to the library of any laboratory using HPLC as a practical separation tool.

RICHARD A. HARTWICK, *Department of Chemistry, Rutgers University*

Sesquiterpene Lactones as Taxonomic Characters in the Asteraceae (The Botanical Review, 48 (2)), F. C. SEAMAN, Harding Laboratories, The New York Botanical Garden, Bronx, New York. Publication Office, The New York Botanical Garden, Bronx, N.Y. 10458. 1982. 474 pp. 15 x 22.5 cm. \$22.50.

The *Asteraceae* (*Compositae*) comprises about 20,000 species and is known as a taxonomically difficult family. Dr. Seaman reviews and summarizes very well the progress made in the development of sesquiterpene lactones as taxonomic characters in the *Asteraceae*, as these compounds are a large class, with 1350 members known (Fig. 32, p. 240), and are almost unique to this family. Although there is no doubt in my mind that the continuing accumulation of information on chemical constituents will definitely aid in bringing about an even better understanding of taxonomic and phylogenetic relationships between the plants of this family in the future, Dr. Seaman's current review will certainly help accelerate the taxonomic utilization of this structurally diverse and interesting group of compounds.

This book contains four major sections which include (1) Biogenesis and Distribution, (2) Sesquiterpene Lactones as Taxonomic Characters, (3) Sub-familial and Tribal Chemistries and (4) Accumulated Sesquiterpene Lactone Report of the *Asteraceae*. The first section describes concisely the biogenesis of major skeletal types of sesquiterpene lactones. This section makes an excellent complement to the identical subject matter presented earlier by Dr. N. H. Fischer and his coauthors in their book entitled "The Biogenesis and Chemistry of Sesquiterpene Lactones" (Springer-Verlag, New York, 1979). The second section discusses in detail how sesquiterpene lactones can be interpreted to yield the most satisfactory taxonomic results in many thoroughly investigated taxa, such as *Ambrosia ambrostoides*, *A. chamissonis*, *A. camphorata*, *Artemisia tridentata*, *Gaillardia pulchella* and *Melampodium leucanthum*, etc. The third section explains how sesquiterpene lactones as taxonomic characters can be best utilized at different taxonomic hierarchical levels for differentiating subtribes within several major tribes: the Vernoniaeae, Heliantheae and Mutisieae. The biogenetic cladistic analysis is applied and discussed in Sections three and four. The last section, which covers a total of 354 pages, lists structures and names for all reported sesquiterpene lactones with plant sources and complete literature references. This section certainly will be very useful to natural products chemists as a good source of references on sesquiterpene lactones. The structures are presented with great accuracy with an exception on canin (p. 307). Based upon a very recent crystal structure determination, the original structural assignment of Lee, Simpson and Geissmann has now been verified, and both epoxides of canin are *cis*, α instead of *cis* β as indicated. Another minor printing error to be noted is "Qing Hao Su" (artemisinine) instead "Quing Hau Sau" as shown on p. 141. Dr. Seaman's book would also be more enjoyable to read by chemists if those fundamental terminologies used in plant taxonomy, such as infra-specific, interspecific, cladistics, Henningian phylogenetic systematics, diploids, tetraploids, etc., could be footnoted and explained.

Overall, I found this book to be well written and documented. It indeed presents a state of the art work on the role that sesquiterpene lactones can play as taxonomic characters in the complicated *Asteraceae* family. I would recommend this book to botanists, biologists, chemists and others with an interest in plant chemotaxonomy.

KUO-HSIUNG LEE, *School of Pharmacy,
University of North Carolina at Chapel Hill*

The Biosynthesis of Secondary Metabolites, R. B. HERBERT, Department of Organic Chemistry, University of Leeds. Chapman and Hall in association with Methuen, Inc., 733 Third Avenue, New York, N.Y. 10017. 1981. ix+178 pp. 14 x 21 cm. \$29.95 (HB); \$13.95 (PB).

With current knowledge of and methodology for the study of secondary metabolism changing at a rapid rate, a monograph or text in this field will necessarily be out of date by the time it is published. With this limitation, R. B. Herbert has provided a timely and scholarly introduction to the subject. All things considered, the book is pleasingly up-to-date, with many references to research published as recently as 1980, including brief mention of current events in the areas of polyketide and indole alkaloid biosynthesis. This timeliness is particularly evident in Chapter 7, where Herbert has chosen interesting examples from the recent literature (mostly 1975 to 1980) to illustrate the diversity of nitrogen-containing natural products from microorganisms and the biosynthetic pathways which give rise to them.

My criticisms are based on editorial choices, but more so on factors stemming from the brevity of the book. Examples of the former can be found in the discussion of terpene biosynthesis. For instance, only the venerable but disproven "x-group" prenyl transferase mechanism is presented (the work of Poulter and Rilling has somehow been overlooked), and insufficient mention is made of Croteau's contributions to the understanding of monoterpene biosynthesis. (The latter is, admittedly, a personal judgement.) It is also disappointing and rather surprising that porphyrin biosynthesis is completely ignored.

Despite its limited length, a great diversity of structural types is discussed, and a large number of isotopic labeling experiments is described. On the other hand, very little of the synthetic and degradative chemistry which attends most biosynthetic investigations is presented. In my opinion, this, plus Herbert's compact writing style, limit somewhat the book's utility as a text. While structures and mechanisms are clearly and accurately drawn, I find it disconcerting that compounds are so often referred to by number (usually four digits!) rather than by name, and that structures are often found several pages from the actual text citation.

The book's greatest strength (aside from those mentioned above) is its thorough referencing. This makes it extremely useful as a guide to the literature and ameliorates the brief treatment of many topics. (An author index would have been very useful, however.) In addition, the book is gratifyingly free of errors. The organization of subjects is mostly quite good, although biosynthetic methodology and reaction types (which are thoroughly discussed in the first two chapters) are frequently illustrated with unnecessarily sophisticated examples. (A detailed discussion of fusicoocin biosynthesis provides a vehicle for introduction of multinuclear NMR techniques, but the basics of terpene biosynthesis are not mentioned for another two chapters!).

Although I chose a different book as the text for my biosynthesis course this semester, I am now convinced that Herbert's book would have been a far better choice. On the whole, it provides an excellent starting point for the study of secondary metabolism.

JOHN M. SCHWAB, *Department of Chemistry,
Catholic University of America, Washington, DC 20064*

Marihuana, An Annotated Bibliography, Volume II. COY W. WALLER, RASHMI S. NAIR, ANN F. MCALLISTER, BEVERLY URBANEK, and CARLTON E. TURNER, Research Institute of Pharmaceutical Sciences, University of Mississippi. MacMillan Publishing Co., Inc., 866 Third Avenue, New York, N.Y. 10022. 1982. xxxv+620 pp. 18.5 x 26 cm. \$29.95.

This book is a continuation of the comprehensive collection of annotated references relating to marihuana which was begun by the authors in *Marihuana, An Annotated Bibliography, Volume I*. The present volume covers international scientific publications from 1975-1979, while Volume I covered the literature on cannabis research from 1964 to 1974. There are 2,669 separate entries in Volume II, and the two volumes together allow the reader access to 5,715 articles. A helpful feature which is new to Volume II is the tabular listing, showing chemical structures, of 421 compounds, including 61 cannabinoids, which were known to occur in cannabis at the time of publication.

The completely referenced and briefly annotated entries are listed in alphabetical order according to the first listed author on the scientific publications. The bibliographic entries are then referenced through an author index and an extensively cross-referenced subject index. The very complete subject index makes it relatively easy to find all of the articles on a specific topic. Locating all of the articles covering the known metabolites of cannabidiol, for example, may be accomplished by searching either "CANNABIDIOL, Metabolism" or "METABOLISM, Cannabidiol."

The brief annotations themselves are generally very descriptive and should be extremely valuable in identifying those papers which are of specific interest to a researcher or research project. Obviously, use of such an annotated bibliography cannot replace a complete literature search; however, volumes I and II should allow workers to identify a number of articles specifically related to their research or interest in a very short period of time. Not the least advantage of possessing such a compact compilation of the scientific literature on any specialized subject is the possibility of "browsing" into areas outside one's own specialty. A chemist, for example, may appreciate the ability to gain a rapid over-view of pharmacological properties or potential medicinal utility of a cannabinoid which he or she has recently isolated or synthesized.

The annotations themselves are generally well written and descriptive. Obviously, the articles which are most easily summarized in two or three sentences are those which present a single study with a clearly identifiable result. Lengthy review articles or chemical syntheses involving many intermediates and steps are considerably more difficult to summarize in a few lines of print. This reviewer checked fifty articles, dealing with the chemistry and metabolism of cannabinoids, from his own collection with the entries in Volume II. In each case, the author of the summary had done a reasonable job of capturing the sense, or most important result, of the article, even though it was impossible to present many details in the limited space available. An additional observation is that the book is, on the whole, remarkably free from errors in pagination, spelling of authors' names, etc. Although a certain number of errors of this type are to be expected in a bibliography, the reviewer found no such errors in any of the entries he checked with the original articles.

Marihuana, An Annotated Bibliography, Volume II should be extremely useful to a variety of researchers working on marihuana or cannabinoids, pharmaceutical and medical educators and their students, and to other interested individuals such as clinicians, public health officials, social scientists, and, to a certain extent, the lay public. Such individuals are not likely to find a more concise and comprehensive source of information on cannabis. The very reasonable price of the book makes it affordable for the individual scientist or student. Certainly, a copy should be in every pharmacy and medical library.

LARRY W. ROBERTSON, *Division of Medicinal Chemistry and Pharmacognosy, The Ohio State University*

Aspects of Cancer Research 1971-1978, edited by JOHN C. BAILAR, III. U. S. Public Health Service, NCI Monograph 52, NIH Publication number 79-1863, Bethesda, Maryland 26265. 1979. 531 pp. 22 x 28.5 cm. \$13.00.

Aspects of Cancer Research 1971-1978 is a selection of Editorials from the Journal of the National Cancer Institute. Most were originally published as Guest Editorials by an impressive array of well known investigators, many of whom have commented on and updated their original contributions with a short addendum. Both the editorials and addenda are well referenced. Human and laboratory studies in such diverse areas as general epidemiology, carcinogenesis, cancer cell biology, immunobiology, virology, experimental pathology, and selected aspects of management, diagnosis, and experimental therapy are well represented.

Of course it is a smorgasbord, but what a feast! From the lead editorial of Sir Dennis Burkitt in which he discusses disease associations and the nature of causation to the final piece by Doctor Jacqueline Whang-Peng on the usefulness of chromosomal banding techniques in human leukemia; from a survey of the Atomic Bomb Casualty Commission's findings by Dr. Robert W. Miller to Dr. I. Berenblum's discussion of unresolved problems in carcinogenesis; from Dr. Howard M. Temin's 1971 summary of the provirus hypothesis to Dr. John D. Scribner's 1975 Editorial on the use of molecular orbital theory in research in chemical carcinogenesis, the range and depth of the contributions is impressive, well-chosen, and prophetic. As would be expected not all the contributions are of equally high quality or concern pivotal research. However, this volume will retain its usefulness for many years to come as a source book of succinct, well-written statements of the problems of cancer research in the 1970's and hence the basis for the progress of the 1980's. It will be especially useful to teachers and graduate students involved in cancer research.

WADE K. SMITH, M.D., *Medical College of Virginia and McGuire Veterans' Administration Medical Center, Richmond, Virginia*