

in this text is on an elementary level and no attempt has been made to cover any involved or sophisticated aspects" and "Care has been exercised in eliminating the time-honored 'it readily follows that' mathematical approach which leaves the student in a puzzled quandary."

The book seems to be relatively error free, but Table 3.8, which gives "chemical examples of important point groups" and extends over 34 pages, contains numerous examples which are misleading or incorrectly assigned, such as the assignment of " $p\text{-FC}_6\text{H}_4\text{CH}_3$ " to the point group D_{2h} , " NH_4Br " to D_{4h} , " $(\text{C}_6\text{H}_5)_2\text{SnCl}_2$ " to C_{3v} , and so on. Finally the reviewer would like to record his sorrow at finding, in a publication intended for the use of students, that the expression "asymmetric vibration" is used regularly instead of the correct term "antisymmetric vibration". That the authors should know better is illustrated by their description of the normal vibrations of the water molecule in the caption to Figure 3.7 and by their correct usage of the term in the text relating to that figure.

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Steroid Drugs. Volume II. Index of Biologically Active Steroids.

By NORMAN APPLEZWEIG, Director, Norman Applezweig Associates, Consulting Biochemists. Holden-Day, Inc., 728 Montgomery St., San Francisco, Calif. 1964. ix + 449 pp. 19.5×26.5 cm. Price, \$10.50.

"This volume attempts to carry forward the coding of biologically active steroids that was started in *Steroid Drugs*, Norman Applezweig (McGraw-Hill, New York, 1962)." Thus the first sentence of the Introduction in Volume II. It is an effort to summarize journal and patent literature on steroids which makes any mention of biological activity. In the 449 pages of this book (a) 13 are devoted to the explanation of the steroid nomenclature, the classification of the biological activities, and a listing (not an explanation) of twenty-one categories of activities; (b) 91 contain tables of biologically active steroids; (c) 430 catalog structural formulas, patent or literature references, and major probable or claimed activity; and (d) 9 list steroid drugs available commercially or for investigative purposes.

This is, therefore, not strictly a book about the 1594 steroids classified but a catalog. Since it lacks an index, the user must seek out for himself any compound or group of compounds by rather particular means. Knowing the type of biological activity he is seeking, ready access to minimum information is available. Indeed, for the major activity categories the author attempts a tabulation of relative biological potencies, *i.e.*, androgenic, estrogenic, progestogenic, and corticoid, on the basis of one or more standard assay procedures. This attempt is not a particularly happy one because variations in assay procedures in different laboratories make over-all comparisons rather unreliable. Indeed, it appears that the author reneged on his intentions in this regard since the table on progestogens lists six columns of tests with some potency figures for the first three but none for the last three; in his listing of tests at the head of the table test 6 is not even described. Similarly, there are six columns in his table of corticoid activity, but the sixth is both blank and unexplained. The listing of relative estrogenic activities is so slight as to be unmeaning.

It is, therefore, the table cataloging of biologically active steroids with its references to literature which is the primary source matter of this volume. Here, despite certain minor irritant headings (*e.g.*, the use of the meaningless activity "antihormonal," the misspelling of lipodiatic as lipodiactic, the inclusion of subnumbers not too understandable—such as 2359 A, B, and C), the industrious searcher may indeed glean adequate references and information on chemical structure. This catalog cannot be entirely systematic in its listing of compounds, but it attempts a fairly logical sequence beginning with estrogens and other 18-carbon steroids and their relatives and derivatives, proceeding to androstane derivatives, thence to pregnane derivatives. This is only mildly helpful in the search for a particular compound or its homologs and analogs. Most of the references are to specific patents which the author acknowledgedly finds not too meaningful in their allegations of biological activities. The journal literature citations are limited and are, interestingly, listed (like the patent references) under the name of the drug house whence the compound originated. The catalog therefore appears

primarily designed for use by the steroid industry rather than by the steroid biologist. It is, nonetheless, a useful guide to the present maze of steroid literature, involving a praiseworthy attempt at systematization on the basis of biological activity, a clear adherence to accepted chemical nomenclature, and a much-needed systematic tabulation of compounds.

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Comprehensive Analytical Chemistry. Volume IIA. Electrical Methods. Edited by CECIL L. WILSON and DAVID W. WILSON in association with C. R. N. STROUTS. American Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York 17, N. Y. 1964. xvi + 268 pp. 16×23.5 cm. Price, \$11.00.

The first volume of this well-known and highly regarded series dealt with classical methods of analysis and appeared in three parts, each of about 700 pages. This much slimmer book is the first of two that are planned to cover electrical methods of analysis. In their preface the editors attribute this division to a desire to "minimize delays in publication due to inevitable hazards in the preparation of individual chapters." No one who has been associated with the preparation of a collective volume can fail to recognize the force of this consideration. It means, however, that this review of half a book can be only an interim report and not a definitive description of the editors' aims and the contributors' success in attaining them.

There are five chapters. In the first, which is a very brief introduction by Arthur J. Lindsey, electrical methods are divided into seven classes: electrolytic, potentiometric, amperometric, coulometric, conductometric, impedimetric ("high-frequency conductometric"), and polarographic. It is apparently intended to deal with the first, second, fifth, and sixth of these in the remainder of the volume, and to describe amperometric, coulometric, and polarographic methods in its successor. The second chapter, also by Lindsey, deals with electrodeposition in 55 pages of text with 111 references, and includes constant-current and controlled-potential techniques, internal electrolysis, and electrographic analysis. The third and fourth chapters, by Donald G. Davis, cover potentiometric titrations (in 101 pages with 422 references) and conductometric titrations (in 38 pages with 138 references), respectively. The fifth, by T. S. Burkhalter, deals with impedimetric titrations in 36 pages with 44 references, 42 of which are also included in a general bibliography of 188 items. The index, in 14 pages, is very good as regards the text, of which only a very few items have escaped inclusion, but it does not include the contents of several extensive tables.

The book is directed toward the practical analyst: according to its editors, its aim is "to provide a working manual." It includes descriptions of the apparatus needed for different kinds of electrochemical analyses, brief summaries of those portions of the theory that are most indispensable in practical determinations, and rather detailed summaries of procedures that have been proposed for determining many inorganic and some organic substances.

This is useful and important information, and it may be said at once that every practical analyst who ever has occasion to use or consider any of the techniques included here will find this book extremely valuable. Davis' two chapters are especially noteworthy: that on potentiometric titrations is the best summary of its topic that has appeared since the book by Kolthoff and Furman.

One cause for regret is that the contributors were not assigned rather broader topics than appears to have been the case; Lindsey's classification in Chapter I promises more than the subsequent chapters include. Thus Lindsey speaks of "potentiometry" but Davis was nonetheless apparently asked to write on potentiometric titrations. This chapter does not mention precision null-point potentiometry or any other application of direct potentiometry save in the measurement of pH; the pM electrode of Reilly, *et al.*, is mentioned because it has been used in potentiometric titrations, but metal-ion-responsive glass and membrane electrodes are not. By the same token, what Lindsey calls "impedimetry" is represented by a chapter whose title includes only its use in titrations; direct impedimetry is mentioned in passing, but in keeping with the title of the chapter there is no mention of its use for analyzing binary mixtures.

Every silver lining has a cloud, and the emphasis on practical application here has sometimes led to more condensation and simplification of the theoretical discussions than might have been de-

sired. Overvoltage is represented only by a very brief discussion of the evolution of hydrogen, and undervoltage phenomena are not mentioned. It is true that excess indifferent electrolyte is usually present in electrodeposition procedures and usually accelerates the deposition, but if its only effect were the one given it would retard the deposition of a cation rather than accelerate it. A platinum electrode in an acidic solution containing chromous ion does not assume the potential of the hydrogen ion-hydrogen couple, but a mixed potential; however, mixed potentials are not mentioned and there is no discussion of the circumstances under which deviations from the Nernst equation are to be expected. In many procedures for electrogravimetric analysis both the electrolysis current and the potential of the working electrode are specified, although each must vary under these conditions if the other is fixed.

This reviewer strongly recommends the present book to those interested in the practical execution of electrochemical analyses, and suggests that its purchase be supplemented by that of the corresponding volume of the Kolthoff-Elving "Treatise on Analytical Chemistry," whose strong emphasis on basic principles will provide the analyst with the background that is essential to the rational and productive application of these techniques.

The book is well printed and bound. It contains remarkably few typographical errors, and at four cents a page its price is unexceptional.

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An Introduction to Practical Infra-red Spectroscopy. Second Edition. By A. D. CROSS, B.Sc., Ph.D., Research Laboratories, Syntex, S. A., Apartado 2679, Mexico, D.F., Formerly Lecturer, Imperial College of Science and Technology, London. Butterworth Inc., 7235 Wisconsin Ave., Washington 14, D. C. 1964. viii + 86 pp. 15 × 24.5 cm. Price, \$3.50.

The second edition of this book differs very little from the first edition, which has proved to be a very useful introduction to elementary theory of infrared spectroscopy, to the basic techniques, and to the application of the correlation charts and tables in the interpretation of spectra. The simplicity of the text has no doubt contributed greatly to the role this book has played in aiding organic chemists unfamiliar with infrared spectroscopy (for whom the book is intended, and in the light of which it must be assessed). Revisions of the second edition are largely restricted to Part I, which is devoted to simple theory and practical aspects. Part II of the book consists of correlation charts and tables of "group frequencies" which have not altered significantly since the first edition was published in 1960.

Part I of the book discusses elementary theory, uses of infrared spectroscopy, the construction and operation of instruments, cells and sampling techniques, phases and solvents, prisms and gratings, quantitative analysis, hydrogen bonding, and the interpretation of spectra. As in the first edition, a main feature of this section is a fascinating fold-out table giving specifications (under sixteen headings, and including prices) of commercial double-beam infrared spectrophotometers in production in June 1963. The seventeen "simplified spectrophotometers" and the twenty "precision spectrophotometers" represent American, British, Japanese, German, and Russian makes. It is unfortunate that a table like this rapidly becomes out of date.

Although the revision of the text was prompted by the many recent developments and refinements in practical technique, according to the author, a considerable number of important advances are not mentioned. Among these are attenuated total reflectance spectroscopy, minimum volume gas cells, and the methods which have been developed for handling minute samples from gas chromatography columns. The use of Irtran-2 cell windows for corrosive liquids and for aqueous solutions is not discussed. The exploitation of temperature dependence of infrared spectra, particularly in structural studies where conformational mobility is involved, is another feature which has been overlooked. The section on cells fails to point out that in the fundamental OH, NH, and CH stretching region quartz ("Infrasil") cells are ideal, and that path lengths of up to 10 cm. of carbon tetrachloride (a limit set by the sample compartment design in most spectrophotometers) can be used in double-beam operation, permitting spectral measurements on very dilute solutions or on difficultly soluble materials.

The correlation data in Part II are given both in frequency (cm.^{-1}) and wave length (microns), and a useful table of reciprocals is included.

Despite some shortcomings this popularly priced paperback deserves wide circulation and is highly recommended to amateur infrared spectroscopists.

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Biochemistry of Phenolic Compounds. Edited by J. B. HARBORNE, John Innes Institute, Bayfordbury, Hertford, England. Academic Press, Inc., Ltd., Berkeley Square House, Berkeley Square, London W1, England. 1964. x + 618 pp. 16.5 × 24 cm. Price, 126 s.

This is the first comprehensive account to be published which deals primarily with the biochemistry of natural phenolic compounds, and as such it is a useful contribution to the literature. The general standard of the fourteen contributions is good and several chapters are excellent. There is, however, one serious defect, but this criticism is not directed at the authors. Although the preface is dated March 1964, very few references are given to papers published after June 1962. This delay in publication of review textbooks is not unusual, but it is a matter which demands the attention of publishers. Some publishers are meeting this challenge, but others seem quite happy to produce high-priced textbooks which are already out of date when they are published. Perhaps the time has come when the date of receipt of manuscripts for textbooks should be recorded in the same way as it is for papers in journals.

The objective of this book was to present an account of the "current situation" concerning natural phenolic compounds which would appeal to the chemist, the biochemist, the plant physiologist, and the geneticist. Subject to the reservation that has already been mentioned, this objective has been achieved.

The introductory chapter (by R. H. Thomson) is excellent in that it provides a discussion of the reactivity of phenolic compounds in terms of the chemistry of a wide range of natural products. The treatment is novel and some of the less well-known facets of the behavior of phenols are included. The second chapter (by M. K. Seikel) discusses the isolation and identification of natural phenols but several serious deficiencies were noted. Color tests are discussed in detail, but there is practically no discussion of thin layer chromatography, and nuclear magnetic resonance is not even mentioned.

The phytochemical distribution of phenolic aglycones (by J. B. Harborne and N. W. Simmonds) and glycosides (by J. B. Harborne) is well reviewed, but the use of leading references rather than references to the original literature is likely to cause trouble when this book is used for direct reference. The study of chemical taxonomy in relation to genetics is now an important trend in the examination of natural products, and the chapter (by R. E. Alston) on the genetics of phenolic compounds is authoritative and lucid.

The wide coverage of this book is indicated by the fact that there are four chapters dealing with the *in vivo* behavior of phenolic compounds. The metabolism of phenolics in animals, in higher plants, and in microorganisms is discussed (by R. T. Williams and G. H. N. Towers), and the physiological and pharmacological effects of phenolic compounds upon animals are reviewed (by P. W. Ramwell, H. S. A. Sherratt, and B. E. Leonard). The role which phenolic compounds can play in connection with pathological conditions in plants, the resistance and susceptibility of plants to infection, and the host-parasite relationship is discussed in detail (by I. A. M. Cruickshank and D. R. Perrin).

Some of the most important advances which have been made recently in plant biochemistry have been concerned with biosynthesis. The reviews on the biosynthesis of phenolic compounds (by A. C. Neish) and on lignin and tannin biosynthesis (by S. A. Brown) are of the high standard now expected from these authors, but it is unfortunate that these excellent reviews have been subjected to a delay of nearly two years.

The natural products chemists who read this book—and many will—will be fascinated by the chapters on the enzymology of phenolic biosynthesis (by E. E. Conn) and the physiological study of phenolic biosynthesis (by H. W. Siegelman). These chapters clearly define areas of enquiry which will continue to attract the attention of the chemist, the biochemist, and the plant physiologist.