Book Reviews

The Structures and Reactions of the Aromatic Compounds. G. M. Badger. Cambridge Univ. Press, New York, 1954. xii + 456 pp. Illus. $11.50.

This book is accurately titled; it relates precisely to structures and reactions of the aromatic compounds. It is well written and definitely readable. It is well documented and the mechanical features are excellent. It is not for the beginner in organic chemistry but should be very valuable to the advanced student and the researcher in the aromatic field. The author has accomplished his aims, as expressed in the preface, and has preserved an objective and broad viewpoint as well as a well-calculated balance of treatment. The literature up to the middle of 1951 has been employed, and the repeated statement that the "evidence on this point is inconclusive" and similar phrases are suggestive to other workers. In addition to a clear presentation, the choice of words is good in that the connotations are clear. A possible exception is, perhaps only to me, occasional confusion between molecular structures and formulas. Despite conventional acceptance and usage of *hybrid* molecule and its dictionary definitions, the word *hybrid* so used leaves something to be desired as a fully descriptive term. (I have no better term to suggest.)

Chapters 1 and 2 present an excellent review of the current status of knowledge and theory of the basic benzene molecule, its structure, its bonds, and internal-energy relationships. Chapter 3 pertains to more or less general properties of aromatic compounds. Chapter 4 treats generally addition reactions; Chapter 5, the aromatic double bond; Chapters 6 and 7, substitution reactions and the effect of substituents. Chapter 8 deals with the interesting Diels-Adler reaction; Chapter 9, photooxidation and photodimerization of aromatic compounds. Chapter 10 discusses the absorption and fluorescence spectra; Chapter 11, optical activity in aromatic compounds. Subject and author indexes are included.

Badger has drawn on world-wide literature and employed organic, physical, and mathematical evidences with a fine and critical sense of applicability and significances. For me, with a span of about 40 years of contact with the organic field, it provides a very satisfactory summation, not only of present status, but of the development over that period of evidences that add up to far more precise current conceptions of basic aromatic structures and behaviors. For example, evidences, among others, include bond distances, energies, angles, resonance energies, dipole moments, substituent constants, and the like. In studying the details of this book, I was reminded of a truism current in my academic days to the effect that, while hypothesis, theory, and terminology may change, sound basic concepts and soundly taken data stand. Although concepts and theory of a generation ago have undergone some modifications and a great deal has been done, through quantitative evidence, to sharpen precision of concepts, the greater change seems to be in terminology, including its expansion. A sample list from this book might include: electronic affinity, electronic symmetry, electronic "sink," electron density, redox potential, mesmeric effect, inductive effect, dynamic tautomerism, orbitals, resonance energy, both positive and negative, benzologues, π-electrons, canonical set, triagonal, positive charge, steric hindrance, reactivity, affinity, and aromaticity. Some of these are older friends than others.

As should be evident at this point, my appraisal is favorable, and the book is strongly recommended.

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Abnormal and Pathological Plant Growth. Report of symposium held 3–5 Aug. 1953. Brookhaven National Laboratory, Upton, N. Y., 1954. (Order from Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.). vii + 303 pp. Illus. Paper, $2.10.

This 300-page volume consists of 16 chapters, each on a different phase of abnormal plant growth, as presented by outstanding scientists in their special fields. The 213 figures and 32 tables are invaluable in presenting accurate conceptions of gross abnormalities on many species of plants. A few papers include detailed photomicrographs of virus material, magnified up to 30,000 times, which cause a certain type of plant enlargement. Splendid microscopic sections portray the structure of these weird overgrowths.

After reading this book one realizes more fully that there are numerous factors or agents that induce abnormal plant growth. These vary from physical agents, such as heat or radiations, to a wide range of chemical and biological stimuli. These various kinds of abnormalities, in turn, are scrutinized and studied under diverse disciplines, such as genetics, physiology, and morphology.

It is doubtful that any previous volume approaches this one for such complete coverage of plant abnormalities. Each paper gives a comprehensive review of the research done on the various types of plant overgrowths, whether genetic, bacterial, virus, or chemical. In addition to the summary following each paper, there is a discussion of the subject matter in the form of questions, answers, and comments. Also, the bibliography accompanying each paper is very extensive and complete.

The legume root nodule, which has intrigued botanists for centuries, is summarized completely under many headings, covering all stages of development. The same is true for most of the topics presented.

This book should make a tremendous impression on all those interested in this special phase of biology.

Students of botany will find it extremely useful because of the complete bibliographies, as well as the interesting discussions on the general subject matter. All articles are presented in technical language, and their use will be largely restricted to students or at least to those with a broad background in biology.

These papers give a clear understanding of abnormalities in plants, together with factors that are known to cause them. Some portions suggest how plant tissues may be stimulated and how they may be retarded. Perchance the basic laws that apply to tissue stimulation eventually can be used in controlled stimulation of a desirable kind. With a better understanding of plant tissue stimulation, perhaps this knowledge can be applied to abnormalities in animal tissues so that more control can be applied to human maladies.

This symposium had as its purpose the assembling of information about abnormal plant growth so that others might be informed and stimulated to carry on in this important branch of research.

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Elsevier's Encyclopaedia of Organic Chemistry. ser. III: *Carboisocyclic compounds*; vol. 12B: *Naphthalene,* A. Compounds containing one naphthalene nucleus. F. Radt, Ed. Elsevier, Amsterdam–Houston, 1953. xlxiii + 703 pp. $66 (ser. subscr. $58; complete subscr. $50).

The formidable cost of "Elsevier" has perhaps persuaded many people that "another Beilstein" was too much of a luxury, even though it offered the convenience of being written in English. I hope this review may convince a few such people that "Elsevier" has so much to offer that technical libraries cannot properly consider themselves adequate without it.

The extremely thorough literature coverage of the newest volume is complete through 1944, with additional structural data up to 1953. The information given is surprisingly detailed, lucid, and easy to follow. The needs of the scientist in fields peripheral to organic chemistry have been well attended to, both in the individual entries and in the index. The inclusion of several topic listings (such as "Growth promoting substances," under which each pertinent substance is listed with its page reference) should endear this work to the biologist and the applied chemist.

The unusual arrangement, wherein compounds of similar carbon skeleton are grouped together, regardless of the degree of saturation, and functional group subdivisions are subordinate to the broad division by skeletal types, is a more useful innovation than might at first appear. The great saving of the user's time, effected by having the most logically related compounds grouped together, should in a few years nearly pay the entire cost of the series for an industrial library.

The nomenclature is a delight; the compilers seem to have intuitively picked the names that the practicing organic chemist would use. Alternative names are given where necessary. Random checks of the accuracy and completeness of this work have evoked my admiration for the compilers' zeal. The literature has been abstracted with a most careful precision, and nothing pertinent seems to have been omitted.

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Index IX to the Literature of American Economic Entomology. Jan. 1, 1948–Dec. 31, 1949. Ina L. Hawes, compiler. Entomological Society of America, 1530 P St., NW, Washington 5, D.C., 1954. 528 pp. $3.50.

This book is the latest issue of a series that has a venerable and distinguished history. The need for a reference work of this kind for the entomological profession was realized as long ago as 1882, at which time publication was authorized by the U.S. Congress of a *Bibliography of Economic Entomology,* parts 1 to 3 inclusive, 1860–1886, to be prepared later by B. Pickman Mann and Samuel Henshaw. This work, when finally published in 1890, was a 454-page, octavo, cloth-bound volume, carefully indexed, and limited in scope to a bibliography of the entomological writings of the noted entomologists Benjamin Dana Walsh and Charles Valentine Riley. Later, this was followed by parts 4 to 8, inclusive, with a total of 751 pages, uniform with the preceding, compiled by Henshaw and Nathan Banks, published by the Congress in 1895, 1896, 1898, and 1901, and covering all the more important contributions to American economic entomology down to the beginning of the calendar year 1905. Issued in very small edition, all these extremely useful volumes were soon completely out of print, and for many years each of them has been a collector's item.

Subsequent to 1 Jan. 1905, the cost of publication of this series, no longer borne by the Congress, was assumed by the American Association of Economic Entomologists, and the volumes were issued at irregular intervals under the title of *Index of American Economic Entomology,* and as numbered special publications. The first of these covered the years 1905–1914, in octavo cloth binding, was compiled by Banks and was issued in 1917. Indexes II to VI covered the years 1915–19, 1920–24, 1925–29, 1930–34, and 1935–39 and were compiled by Mabel Colcord. Index VII and subsequent issues have been compiled by Ina L. Hawes, assisted at various times by W. H. Mitchell, Ethel L. Coons, Alice Renk, S. W. Bromley, and others.

Beginning with Index VII, it became necessary to enlarge the geographic scope of the series to comprise continental North America, including Canada, Alaska, Mexico, Panama Canal Zone, Cuba, Puerto Rico, Hawaii, and certain other Pacific islands, particularly those that played a part in World War II. It also became desirable that the common names of insects be used, as approved by the Committee on Common Names of Insects. Index VII covers the years 1940–44; Index VIII, 1945–47; Index IX, 1948–49;