# 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, $\pi$-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.