Book Reviews

Fluorine Chemistry. vol. II. J. H. Simons, Ed. Academic Press, New York, 1954. x + 565 pp. Illus. $13.50.

Volume II of *Fluorine Chemistry,* like volume I, is composed of contributed chapters. Some of these are excellent. Perhaps the most outstanding chapter in this book is the one contributed by Philip J. Elving, "Anlaytical chemistry of fluorine and fluorine-containing compounds." This chapter is new to this two-volume series, and it covers the analytic aspects of fluorine chemistry very well. The most modern methods for the determination of the fluoride ion, the detection and identification of fluorine, and the determination of fluorine in fluorine compounds are presented in an elegant manner. Also, an extensive bibliography is given as a part of this chapter and should be of value to those interested in the analytic aspects of fluorine chemistry.

H. J. Emeléus is the author of two of the chapters, one of which is on "Halogen fluorides," giving recent advances with these substances. This chapter is interesting but short, since a more extensive discussion of the subject occurs in volume I. The other chapter by Emeléus is an excellent one on "Metallic compounds containing fluorocarbon radicals and organometallic compounds containing fluorine." There has been a great deal of excellent work on these substances in recent years. A number of compounds, such as trifluoromethyl derivatives of mercury, phosphorus, arsenic, sulfur, magnesium, and zinc, have been prepared, and some of their properties have been determined. A number of alkyl and aryl silicon fluorides are reported. It is interesting to note that the chapter is devoid of perfluoro alkyl silanes.

A chapter by Alan G. Sharpe on complex fluorides of groups 1–8, inclusive, shows that there is a great deal now known on fluorine-containing complex salts and acids. Methods of preparation and chemical properties are discussed.

The chapter by Paul Tarrant on "Organic compounds containing fluorine" is an interesting review of selected researches with fluorine-containing organic substances. Derivatives of hydrocarbons, alcohols, ethers, aldehydes, acids, amines, dyes, drugs, pesticides, and polymers are taken up as separate sections. It would not be practical to cover completely this subject matter in one chapter, but Tarrant has given some of the most interesting and significant achievements on the preparation and properties of these substances. In addition, he has given a table on the properties of organic fluorine compounds. This table includes a method of preparation and a literature reference for each of the compounds listed. The bibliography, which covers 556 references, should be of value to those doing research in this field of fluorine chemistry. Unfortunately, at least two types of nomenclature are used in this chapter, one of which has no basis for acceptance.

The chapter on "Fluorocarbon chemistry" by the editor presents some valuable information on the preparation and properties, especially physical properties, of fluorine-containing organic substances, including fluorocarbons. Most of the compounds in this chapter are given by structure or molecular formula. When compounds are named, it is frequently by a system of nomenclature used seldom except by the author himself.

Infrared spectra are given for a large number of fluorine-containing organic substances. This chapter by D. G. Weiblen discusses, among other things, stretching frequency for several groups of atoms, such as C=C, C=O, C≡N.

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An Introduction to Plant Taxonomy. George H. M. Lawrence. Macmillan, New York, 1955. viii + 179 pp. Illus. $3.25.

This is largely a distillation, designed "for the adult amateur botanist and the student of a local flora course at the college level," of the same author's excellent *Taxonomy of Vascular Plants* (1951). The core of the *Introduction* consists of a beautfiully illustrated compendium of external plant morphology that should prove most welcome to the student. One might quarrel with the retention of the pre-evolutionary and outmoded term *pistil,* and of an artificial classification of fruits, but the chapter is doubtless designed to match the terminology in current manuals. Only slightly less central is the chapter on important plant families, in which 42 groups are represented by thumbnail descriptions and, frequently, by line drawings.

Supplementary chapters include a terse history of the development of plant classification and a history of plant taxonomy in the United States based largely on the books of Rodgers, respectively. The former stresses the phylogenetic systems of Engler (with an uncredited diagram that I recognize as that prepared several years ago by Thomas Morley), Bessey, and Hutchinson. The "modern" aspects of taxonomy are treated very sketchily and serve principally to inform the student that such matters may deserve consideration. The author's abridged remark that "phylogeny . . . is not essential to the demands on taxonomy as a functional science," does not seem calculated to stimulate such interest.

Lawrence's books should be given full credit for elevating textbooks in this field to the level of teaching. The *Introduction* will command a wide audience, and its limited scope and lower cost should encourage its adoption as a textbook.

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The Gyroscope Applied. K. I. T. Richardson. Philosophical Library, New York, 1954. 384 pp. Illus. $15.

The author states in the introduction that the purpose of this book is to describe what the gyroscope is, how and why it works and to indicate how and why it has come to play such an important part in scientific progress, especially in marine and aeronautical transportation and military operations. The book is divided into five sections, the first being a general statement of the basic principles and describing some of the wider known applications of gyroscopic properties. This is followed by individual sections devoted, respectively, to marine navigation and stabilization, aeronautical navigation and automatic control, military weapon control and sighting, and finally the use of gyroscopes on land for such devices as monorail and two-wheeled vehicles and for surveying. As would be expected, most of the contents deal with British-manufactured equipment.

The section on marine applications describes the Sperry, Brown, Anschütz, and Plath gyro compasses, the application of the gyro compass to automatic steering control, and the gyroscopic stabilization of ships. All instruments and apparatus are carefully and clearly described and are illustrated by excellent diagrams and by many halftone reproductions of photographs. (The book is

printed on glossy paper, and the quality of the illustrations is to be commended.)

The section on aeronautical applications includes a description of navigational instruments, gyro-verticals, rate-of-turn indicators, and automatic pilots. Naval gunnery, aircraft bombsights, gyroscopic gunsights, and the control of torpedoes and guided missiles are discussed in the section on military applications. This section is understandably brief, although the automatic pilot mechanism of the V-2 is described in some detail. References are given throughout the book and a bibliography is included in the appendix.

The book is recommended as a reference to anyone wishing to learn the details of the practical applications of gyroscopic principles. It is in no sense a textbook and the description of "why" the gyroscope works is not as complete or satisfactory as that of "how."

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Fundamentals of Radiobiology. Z. M. Bacq and Peter Alexander. Academic Press, New York; Butterworths, London, 1955. xii + 389 pp. Illus. $6.50.

This book is a stimulating review of radiation biology as it appears to a physiologist and a radiation chemist. The first four chapters deal with the elements of radiation physics and with the radiation chemistry of water and of large molecules. They are a succinct and well-balanced review of the basic principles and recent developments in these fields. The emphasis in much of the remainder of the book is on the early biochemical and physiological effects, especially in mammals. Considerable space is devoted to protective substances and means of influencing recovery. The view is developed that many of the biological effects are mediated by radicals, especially HO_2, and that the original damage is often in the cytoplasmic organization, quite possibly in the structures that serve to keep the various enzyme systems and substrates partially separate from one another. This book is the most complete presentation of this point of view available and obviously contrasts sharply with interpretations that emphasize the role of the nucleus and the target theory. One may disagree with some of the conclusions but must still recognize that it is a thought-provoking account well worth careful reading.

However, there are certain shortcomings that cannot be entirely ignored. The proofreading was not done very carefully. More data should have been given on the toxicity of compounds, such as cysteamine, that are recommended as practical protective agents. One could wish that more effort had been made to relate the biochemical and physiological findings with histological and cytological observations. For example, it would be useful to know how far some of the biochemical effects could be interpreted as incidental consequences of cell death.

The chapter on cytology and genetics is to a very large extent confined to the Koller-Darlington point of view. This is not the place to detail the objections that can be raised to their position. The real difficulty arises from the misleading one-sidedness of the chaper. A reader unfamiliar with the field would hardly realize that there was another point of view with a considerable group of adherents. Thus a paragraph is devoted to Lane's intensity experiment without mention that three groups of workers have failed to confirm his work and have severely criticized portions of it. It would have been better to have omitted this chapter entirely than to have given such a misleading account.

Despite such shortcomings, the book is an important addition to the literature of radiation biology and should be read by all who are interested in this field.

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The Nucleic Acids. Chemistry and biology. vol. I. Erwin Chargaff and J. N. Davidson, Eds. Academic Press, New York, 1955. xi + 692 pp. Illus. $16.80.

To surpass an excellent little compendium entitled *The Biochemistry of the Nucleic Acids,* its author would have to enlist a constellation of experts and somehow contrive to distill from the separate work of their several minds an organized treatment of this ever-growing topic. With the aid of an equally illustrious fellow-editor, that British author has succeeded in accomplishing these things in volume I of what promises to be the classic reference book in the nucleic acid field.

In the first volume the organic and physical chemistry of the nucleic acids and their constituents and the distribution in nature of the component purine and pyrimidine bases are thoroughly considered. A later volume is to deal with the biological distribution and functions of the nucleic acids, their biosynthesis and that of their constituents. Except for the compact little book mentioned, there has been no treatise issued in this field for almost 25 years. It might be best to indicate for prospective readers the scope and character of this rather expensive new book rather than attempt high criticism of what is, after all, the only work of its kind.

A short introduction by the editors builds a historical framework that helps to provide perspective and organization for the contributed chapters that follow. W. G. Overend and M. Stacey now begin to weave the story of the nucleic acids by telling the history and distribution of the sugar components. There follows a guide to the preparation and properties of ribose, deoxyribose, and related compounds, complete with a table giving the optical rotation and melting point of more than 200 derivatives. The purines and pyrimidines are dealt with in a chapter by A. Bendich that includes a good survey of their physical and chemical properties. The classic synthetic work of the 1890–1930 period is made accessible and integrated with modern work in a manner applicable to future problems of synthesis of purine or pyrimidine intermediates, analogs, and coenzymes, for example, those bearing isotopic constituents.

In Chapter 4 the more complex chemistry of the nucleosides and nucleotides limits J. Baddiley more sharply to the past and present. The difficult work that has been done in this area is competently described, and some attempt is made to discuss the principles, possibilities, and limitations of making conversions in these more complicated molecules. Isolation from nature (thrice capitalized: *Nature*) has a somewhat awesome aspect in this chapter; thymine deoxyribose-3-phosphate is called "unnatural" since it has not been isolated, although it is certainly contained in deoxyribonucleic acids (DNA). The biochemistry of the nucleotide coenzymes is well represented, although only briefly; it does not appear that this subject will be taken up elsewhere in the two volumes.

There follow several chapters dealing with methodology in analysis and separation of nucleic acids. In a short one, H. S. Loring describes experiences with the hydrolysis of nucleic acids and some of his own methods for base analyses of ribonucleic acids (PNA) by precipitation and spectrophotometry. Data are given for yeast, tobacco mosaic virus, mitochondrial and microsome, PNA composition. The ion-exchange chromatography of the bases, nucleosides, mono- and poly-nucleotides is discussed with brilliant clarity in a veritable manual of methods by W. E. Cohn. The principles and alternative approaches included should certainly make this useful for those encountering new separation problems. A treatment of paper chromatography of bases and nucleosides by G. R. Wyatt follows; methods of hydrolysis are critically examined, and there is much information about choice of solvent and quantitative technique. This author should receive special praise for his effi-