Book Reviews

Atomic and Free Radical Reactions. vols. I and II. ACS Monograph Series. E. W. R. Steacie. Reinhold, New York, ed. 2, 1954. x + 901 pp. Illus. $28 the set.

This work, a revision and an enlargement of the one published in 1946, summarizes most of the known information about the gas-phase reactions of atoms and free radicals with organic molecules. The first chapter is a 12-page introduction to the concepts of chemical kinetics, principally those of particular application to free-radical reactions. The 58-page chapter on experimental methods is a systematic discussion of the methods for producing and measuring free radicals in the gas phase, and it is not a laboratory manual. The next chapter (28 pp.) is a critical discussion of the methods for determining bond dissociation energies, and it is a compilation of reasonably well-established values. The first volume ends with two chapters on the major thermal (176 pp.) and photochemical (207 pp.) reactions involving free radicals.

The second volume begins with a 24-page chapter summarizing the activation energies and frequency factors for several groups of elementary reactions, a typical group being the abstraction of H atoms by methyl radicals from a series of compounds. The bulk of this volume (278 pp.) is devoted to a systematic listing of information about the rates of 1034 elementary reactions, for example, $H + C_2H_6 \rightarrow C_2H_5 + H_2$. These are the elementary reactions, which, in combination, represent the mechanisms of most of the overall thermal and photochemical reactions discussed in the first volume. Volume II concludes with author, subject, and reaction indexes and with a bibliography of 2086 entries.

The book seems to be exhaustive and carefully done. The tenor of the discussions is cautious, and conflicting views are set out fairly. A serious fault is the price, one factor of which is the high unit cost of 3.1 ct per page compared with 2.6 ct for the average of 10 of the books advertised on the dust jacket, and with about 2.2 ct for some recent books of probably smaller general interest. It is, therefore, all the more desirable that the organization of the book minimize the total number of pages. The author's arrangement fails in this respect since, although it is a convenient one, it leads to considerable duplication. For example, the decomposition and polymerization of propylene is discussed in three pages of the section on free radicals in thermal reactions, the discussion referring to some 16 papers. In the detailed section on individual reactions, nine of these references are repeated, some with almost the same wording. Such duplication is not undesirable per se, since one reads the different sections for different purposes, but it is an expensive luxury. Another luxury is the format of much of the second volume, where each reaction is set off by itself even if the information is only a cross-reference, and where the information is given *in extenso*. One would think that a tabular presentation could have been devised that would serve for all except a few of the most-studied reactions.

With the accelerating growth of chemical research, it is more than ever necessary to have compilations such as this one that offer the chemist a critical and reasonably complete survey of the data of a particular field. Kineticists will be grateful to Steacie for filling so well the need in this field.

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The Development of Medical Bibliography. Estelle Brodman. Medical Library Association, 1954 (Order from: Archives Curator, Medical & Chirurgical Faculty of State of Maryland, Baltimore 1). ix + 226 pp. Illus. + plates. $5.

Foundations of modern librarianship were laid in the last quarter of the 19th century when the expanding literature made the "keepers of books" realize that a more systematic arrangement of books was necessary. Thus was developed that phase of librarianship which is commonly referred to as library economy. So important were these basic techniques considered that for many years they overshadowed in emphasis the necessity for scholarship so essential to true librarianship. As librarianship grew, the need of specialization within the profession began to develop. More than 50 years ago a small group of medical librarians and physicians assembled in Philadelphia to organize a professional association for furthering the aims of medical librarianship. This group has continued to promote standards for libraries and librarians. Progress has been made in establishing a profession of medical librarianship, but only recently has attention been turned toward the fundamental basis of any profession and that is scholarship. Brodman's monograph is a landmark in medical librarianship because it demonstrates that medical bibliography is a scholarly pursuit and that scholarly investigations can be undertaken within the field of medical bibliography.

Brodman's purpose, as stated in the preface, was to write a history of the development of medical bibliography. This history was to be interpretive, not simply a chronicle. Her approach to the problem was both logical and thorough. She examined all known bibliographies of medicine that were available, interpreting their place in the history of medical bibliography. She presented the problem of indexing of each era and the solution of this problem by the bibliographer. Each bibliography's contribution to the art of bibliography was then reviewed. Its failings were pointed out and discussed so that one has a clear picture of the place of this particular bibliography in history. It is the

third chapter, "The golden age of individual bibliographers," that is so interesting to the bibliographer of today. For here are described the various problems confronting the 19th century bibliographer who was trying to index a rapidly expanding literature. The importance of this period is that we are today mainly following the same principles of indexing and we are encountering the same difficulties that Plocquet saw and tried to overcome. In conclusion, the author points out that the problems which beset medical bibliography in the past are the same today, only the quantity has changed, not the quality. Notwithstanding the development of mechanical aids, it has not been possible to work out methods for solving the index requirements of modern medical science. The individual bibliographer is still the key to indexing.

The work closes with a list of references and medical bibliographies published since 1500. A well organized author index to bibliography and a general index concludes the monograph. In very readable style and well documented, it gives an excellent comprehensive picture of medical bibliography, both past and present, the difficulties encountered, how they were solved, and the meaning this has for those who are trying to solve the problem of medical indexing today.

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Physics and Applications of Secondary Electron Emission. H. Bruining. McGraw-Hill, New York; Pergamon Press, London, 1954. xii + 178 pp. Illus. $5.

This is a survey based in large part on 393 papers related to the emission of electrons from different kinds of substances in the solid state, from the discovery of the phenomenon in 1902 through 1952. The first seven of the 10 chapters are on physical aspects and the last three are concerned with application aspects. These three chapters are on electron multiplication, disturbing effects that arise from secondary emission, and desirable effects produced in electronic tubes of various kinds. It is evident that a complete theory of the mechanism of secondary electron emission does not yet exist, and that the author has surveyed the various approaches that have been made.

The monograph fulfills its primary purpose quite adequately. It falls a little short of being an elementary textbook since part of what is said in chapter 1 assumes knowledge of the terminology and ideology of later chapters, and in a few spots the sentences lack the details desirable in a textbook. As a reference for the researcher and a guide for the advanced seminar student, the book is excellent.

The chronological list of 393 references appears to be exhaustively complete. The references published during the first 30 years after discovery of secondary electron emission are almost all American or German, about equally divided. The first Japanese reference is dated 1933. It is interesting to note that the Russian references begin abruptly with six in 1936, marking the start of a period of intensive activity that yielded 40 papers in 6 years. These references drop as suddenly to a low rate of occurrence, and none are listed after 1947.

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The Infrared Spectra of Complex Molecules. L. J. Bellamy, Methuen, London; Wiley, New York, 1954. xvii + 323 pp. Illus. $7.

In recent years infrared spectroscopy has assumed an increasingly important role in the industrial research laboratory and has taken its place along with other physical methods of analysis, such as optical spectroscopy, x-ray diffraction, and mass spectroscopy. It has been adequately demonstrated that, as a method for the recognition of structural groups in compounds, for the recognition of compounds in mixtures, and in quantitative analysis, it is applicable to classes of problems not easily, if at all, handled by other methods. So widespread are the applications of infrared spectroscopy to allied fields that many investigators with various backgrounds are finding it advantageous to employ infrared methods and to learn the basic methods of interpretation of the spectra obtained. With the exception of the general and elementary discussion by Barnes, Gore, Liddel, and V. Z. Williams, and the more recent and fuller account by Randall, Fowler, Fuson, and Dangl, there has been no single work to which the investigator could go for information on this subject. To be an effective worker in this field demands a wide knowledge of and experience with the absorptions by a great many compounds containing the same or similar structures. Since the literature is scattered over many journals and years, this knowledge is difficult to come by. It is, therefore, my opinion that there has long been a need for a book such as this one, and that present investigators and students alike owe a debt of gratitude to Bellamy for having correlated and reviewed critically this great mass of empirical data.

Bellamy's treatment of this complicated subject is orderly and clear. The knowledge that is necessary in structure recognition and correlation is, to a large extent, empirical in nature. Bellamy has made a critical survey of the existing data on which such correlations are based, and he has drawn conclusions that will be of aid to new and old workers alike in pursuing independent recognition researches. He has divided the mass of information into four parts consisting mainly of the following topics: part I, C—O and C—H linkages; part II, C—O and O—H linkages; part III, C—N and N—H linkages; and part IV, vibrations involving other elements or elements of inorganic origin. Each part is then further broken