Book Reviews

Natural and Synthetic High Polymers. 2nd ed. Kurt H. Meyer. New York–London: Interscience, 1950. 915 pp. $15.00.

This new "completely revised and augmented edition," like the first edition, has as its objective the presentation of a systematic account of the entire field of natural and synthetic inorganic and organic high polymers. The first edition established itself as a textbook giving an inspiring and broad introduction to the theoretical aspects of high polymer chemistry. It has been found a valuable correlative reference work, offering key references and a stimulating and broadened viewpoint for the research worker. The second edition will be even more valuable in both applications.

The text has been increased approximately 28% to encompass new trends appearing in the literature. Conservative expansions have been made in many areas, and considerable portions have been rewritten. An indication of how thoroughly the book has been revised can be obtained by comparing the references cited. The new edition contains nearly 2,100 entries, many of which include more than one literature citation. Not only have many new references been added, but some of those appearing in the first edition have been deleted. The entries indicate that the literature survey was completed through 1949. The largest expansion (from 43 to 137 pp.) of any major subject area was made in the section on "Properties of High Polymers in Solution," written in collaboration with A. J. A. van der Wyk. In fact, this section became two, the second being "Elasticity, Viscosity and Plasticity of High Polymers," on which C. Weissenberg also collaborated. In view of the considerable progress and publication in the field of synthetic rubbers in the past decade, it is surprising, even disappointing, that the discussion of these polymers has decreased slightly. The book is remarkably free of errors, and congratulations on this point are due to author, translator, and publisher.

Expansion of the subject index (from 11 to 28 pp.) has not been entirely due to the introduction of new material, but to a new format and an effort to render the work more useful as a reference. Despite the excellent cross index, the specialist will miss many interesting references to his own field unless he reads the entire volume in detail. For example, the index will not reveal to the elastomer worker comments on the rubberlike properties of melted cheese (p. 573), the contrast of muscular contraction and relaxation with unvulcanized and vulcanized rubber (p. 571), properties of pure amorphous rubber (p. 527), pictures of stretched and frozen rubber compared with tendons (p. 533), several comparisons between rubber and proteins, etc. Or, if an investigator seeks references to uronic acids (galacturonic, glucuronic acid), or aldobionic acid (pp. 440–441), chitosan (p. 452), glutathione and asparthione (p. 619), or the use of the sodium salt of starch-glycolic acid as an emulsifying agent (p. 482), etc., he may fail to spot these because of their absence from the index. These comments are meant not as criticisms of an excellent index but rather as indications of the intriguing and provocative correlations of polymeric chemistry that the author makes.

The specialist will find the book helpful in broadening his concepts, but he will also be due for certain disappointments. He will probably feel that his own field has been inadequately discussed. In spite of the careful literature annotations, he will find interesting comments for which references are lacking; for example, "Sulfonated polyanethole (Liquid Roche) is said to have an effect like that of heparin in preventing clotting of the blood" (p. 181), and "other olefins such as nitroethylene can also be polymerized" (p. 182). American readers probably will note the absence of some familiar developments, trade names, and references and more utilization of European data less familiar to them.

The student will enjoy the systematic arrangement of the subject matter, analogous to the order of presentation in the chemistry classroom. The chemistry of inorganic high polymers is presented first, followed by the chemistry of organic polymers arranged in the order hydrocarbons, halides, alcohols, ethers, esters, sulfides, cellulose, polysaccharides, lignin, proteins, then the physical properties of high polymers, and finally the biochemistry of high polymers. The student will find here a brief but adequate picture of the fields of high polymer chemistry, but with a minimum of comment on industrial applications. In employing this volume as a textbook, the proximity of the author to German and other European viewpoints and literature should be borne in mind. For example, those who have had a part in the U. S. synthetic rubber program would not unanimously agree with the implications of its initial complete dependence on German "know-how" set forth on page 214:

> As a result of an understanding which provided for a complete exchange of patents and experience reached with I. G. Farbenindustrie in 1929, the Standard Oil Company of New Jersey had the process at its disposal and during the war issued licenses to numerous other works supported by the U. S. Government. Investigations were carried out to improve the process and to adapt it to large-scale manufacturing, so that today an enormous quantity of these synthetic rubbers is produced in the United States; moreover the research work carried out under the sponsorship of the Rubber Reserve has led to products highly superior in quality to the original German Buna S.

That the "know-how" was *not* available is indicated by the following statement by Thurman Arnold in the hearings on scientific mobilization (Hearings on Senate Bill 702, 78th Congress, 1st Session, Part I, p. 48,

March 30, 1943): "The know-how on making the synthetic rubber itself was not given to anyone outside Germany because the Hitler Government prohibited it." Again, the neophyte may gather that butadiene is predominantly synthesized from acetylene, a process not employed in this country (p. 215). In connection with sodium polymerizations, it would seem that a reference to the excellent work of A. A. Morton *et al.* with alfin catalysts was deserved. In the recipe for GRS given on page 218 appears the notation "fatty acid soap (90% sol)," which needs interpretation.

On pages 218 and 219 Buna S_3 is twice mentioned, and it is stated, "No copolymer proved better than Buna S_3," yet no explanation is given regarding what Buna S_3 is polymerically. On page 223, in discussing the properties of Butyl rubber, no mention is made of its outstanding low gas permeability, the property that has brought it into wide use in inner tubes.

That this book is far more than a reference work or a textbook, but has as its objective the setting forth of a concept with all the eloquence of a superb teacher, investigator, and writer, is indicated by the following closing sentences:

> The number of problems in the solution of which biology and the chemistry of high polymers must join forces is infinite; wherever there is life there is structure, a structure built up from high polymeric molecules. As research advances, the greater is our perplexity, the greater our veneration and admiration for the true master of our science—living Nature.

This book should be read by all who are interested in high polymers.

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The Principles of Cloud-Chamber Technique. J. G. Wilson. New York: Cambridge Univ. Press, 1951. 131 pp. $2.75.

With the recent increase in the use of cloud chambers for experiments on high-energy particles, especially in connection with the large accelerators, there has been a great need for a book describing the techniques used in cloud chamber work. It is a pleasure to report that this book, though quite short, goes a long way toward filling this need. Wilson has spent many years working with cloud chambers and has had the advantage of working in the laboratories of C. T. R. Wilson, inventor of the cloud chamber, and P. M. S. Blackett, who made many important contributions in the development of cloud chambers into precision instruments.

The book begins with sections on the fundamental theory of cloud chambers and the ionization of high-energy particles, continues with chapters on operation and photography, counter control, and techniques of precision measurements. The final chapter on the interpretation of cloud chamber photographs is a subject that deserves somewhat more space than it was given. Although much of the material has been published elsewhere, it is scattered through various periodicals and often difficult to find. Dr. Wilson has collected and correlated the work of many experimenters and has in addition added a considerable amount of heretofore unpublished information, especially in the sections on photography and on measurement techniques. The actual mechanical design of cloud chambers is almost completely omitted, but many operational techniques are included that are never mentioned in the literature. The discussion of continuously sensitive cloud chambers is limited to a description of Langsdorf's chamber and does not include some of the recent work on these instruments.

The writing is clear and concise, and the book is likely to be very useful to anyone using or planning to use a cloud chamber.

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Scientific Book Register

The Sea Around Us. Rachel L. Carson. New York: Oxford Univ. Press, 1951. 230 pp. $3.50.

Structural Geology of North America. A. J. Eardley. New York: Harper, 1951. 624 pp. $12.50.

Lectures in Abstract Algebra: Basic Concepts, Vol. I. Nathan Jacobson. New York: Van Nostrand, 1951. 217 pp. $5.00.

The Chemistry and Action of Insecticides. Harold H. Shepard. New York–London: McGraw-Hill, 1951. 504 pp. $7.00.

Enzymes and Enzyme Systems: Their State in Nature. John T. Edsall, Ed. Cambridge, Mass.: Harvard Univ. Press, 1951. 146 pp. $2.75.

The Enzymes: Chemistry and Mechanism of Action, Vol. I, Part 2. James B. Sumner and Karl Myrbäck, Eds. New York: Academic Press, 1951. Pp. 725–1361. $12.80.

Pierre Curie. Marie Curie; Autorisierte deutsche Ausgabe von Anna Kerschagl. Vienna: Springer-Verlag, 1950. 89 pp. $1.00.

Electroencephalography in Clinical Practice. Robert S. Schwab. Philadelphia–London: Saunders, 1951. 195 pp. $6.50.

Ruwenzori Expedition 1934–5: Chloropidae, Vol. II, No. 7. Curtis W. Sabrosky. London: British Museum (Natural History), 1951. Pp. 711–828. 15 s.

Watch Out for the Weather. Jacqueline Berke and Vivian Wilson. New York: Viking, 1951. 226 pp. $2.95.

Diseases in Old Age. A clinical and pathological study of 7,941 individuals over 61 years of age. Robert T. Monroe. Cambridge, Mass.: Harvard Univ. Press, 1951. 407 pp. $5.00.

Audubon Water Bird Guide: Water, Game and Large Land Birds. Sponsored by National Audubon Society. Richard H. Pough. New York: Doubleday, 1951. 352 pp. $3.50.

Progress in Metal Physics, Vol. 2. Bruce Chalmers, Ed. New York: Interscience; London: Butterworths, 1950. 213 pp. $8.00.

Clinical Tropical Medicine. R. B. H. Gradwohl, Luis Benitez Soto, and Oscar Felsenfeld, Eds. St. Louis: Mosby, 1951. 1,647 pp. $22.50.