polysaccharides'' and ''synthetic materials.'' It was shown that polyelectrolytes are highly associated in solution. It was further suggested that ''some of the problems of the biochemist will be reduced to special problems in a broader field—that of polyelectrolytes in general.'' However, these colloidal electrolytes, such as bile salts, have already received much attention both from physical chemists and biochemists, and their properties are just as closely related to the other colloidal electrolytes excluded in the quoted definition of ''polyelectrolytes.''

It would seem that the introduction of such a term would merely lead to confusion in this well established field. The term polyelectrolytes is not self-explanatory and might seem to refer to polyvalent electrolytes or to those that give rise to a variety of ions.

In a previous paper the term ''chain electrolytes,'' which seems equally inapt, was coined (D. Edelson and R. M. Fuoss. *J. Amer. chem. Soc.*, 1948, **70**, 2832). Another partial term is that of ''long chain salts'' (P. F. Grieger and C. A. Kraus. *J. Amer. chem. Soc.*, 1948, **70**, 3808), which is also inadequate.

It now seems impossible to draw a sharp distinction between polymerization and association. Aluminum soaps are one instance of a borderline case. During the past year some authors have classified these as association colloids because their particle size or molecular weight depends upon concentration. Several other authors prefer to regard them as ''polymers of high molecular weight formed by weak intermolecular links'' such as hydrogen bonds. Both groups are describing the same facts.

It would seem advisable to retain the thoroughly established name ''colloidal electrolytes'' for all such materials, even if there are subgroups such as organic, inorganic, organic-inorganic, some that are purely products of association, and others that are simple polymers, or associated polymers, etc. A subgroup such as polyelectrolytes might be useful if it were sufficiently sharply and narrowly defined to include only one definite class of materials. The term ''colloidal electrolytes'' clearly includes them all and emphasizes their interrelatedness and common properties.

JAMES W. MCBAIN

Department of Chemistry,
Stanford University, California

Erratum

May I point out a confusing error that occurs in the last line of Table 1 in our recent short paper (H. H. Plough and Madelon R. Grimm, ''Reversal to Penicillin Sensitivity in a Cysteine-requiring Mutant of *Salmonella*,'' *Science*, February 18, 1949, pp. 173–4). This should read: ''S. D. alone – – – – – – –,'' that is, seven minus signs instead of one minus and six plus signs. I had to correct in galley an error of the original manuscript under a similar heading five lines above, and I assume that somehow the last line got shifted too.

H. H. PLOUGH

Department of Biology,
Amherst College, Amherst, Massachusetts

Book Reviews

The chemistry of high polymers. C. E. H. Bawn. New York: Interscience, 1948. Pp. + 249. (Illustrated.) $4.50.

This is an excellent book and fills a real need in the field of polymer chemistry. While more advanced treatises on individual topics have appeared during the past few years, no other book has summarized the whole field of polymer chemistry so clearly and succinctly. The book is very readable and understandable but at the same time has neither sacrificed correctness nor oversimplified the problem.

The book is divided into the following seven chapters: Introduction: Nature and Types of Polymer; Condensation Polymerization; Addition Polymerization; Thermodynamics of Solutions of High Polymers; Size and Shape of Macromolecules; The Structure, Stereochemistry and Crystallinity of High Polymers; and Structure and Physical Properties of High Polymers. Each of these chapters is fairly complete and detailed, with the exception of the last, which is a rather brief outline of the physical properties of high polymers. Fairly extensive references to recent literature are included.

This book should be particularly valuable to the graduate student in chemistry who seeks a broad picture of the present status of polymer chemistry without the necessity of wading through four or five lengthy monographs on highly specific subjects. It also deserves a place on the bookshelves of research workers in the field of polymer chemistry.

TURNER ALFREY, JR.

Polytechnic Institute of Brooklyn

Lès richesses de la mer: technologie biologique et océanographique. (Encyclopédie Biologique, XXIX.) Noël Boudarel. Paris, France: Paul Lechevalier, 1948. Pp. 548. (Illustrated.) 1.500 fr.

The information collected in this volume should prove immensely helpful to the more curious fishermen along the French coasts and provide a strong stimulus to those with a bent toward natural history. In addition to short chapters on the origins and development of oceanography, the characteristics of ocean water and bottom, and the common terrestrial plants found along the seashore, there

are more extended and profusely illustrated accounts on the algae, mollusks, fish, fish nets and traps, and fisheries. Other groups of marine life receive less full treatment, the criterion for inclusion often being their economic value or relationship to the fishing industry. Each kind of organism is treated under its scientific name, with common names furnished as well as distribution and a general verbal description. Interspersed are many comments on the uses to which the animal is put.

The illustrations are apparently all from original drawings. All are line cuts, and the printer has done well by them. Those of fishing scenes and gear are drawn in good perspective, but they may surprise readers used to halftone illustrations. The lack of halftones is noticed so quickly that one might suppose the book to have been written before the days of photography. The text, however, seems up to date. There is a short bibliography and a good index.

LORUS J. and MARGERY J. MILNE
University of New Hampshire

Psychology. William James. (Introduction by Ralph Barton Perry.) Cleveland-New York: World Publ., 1948. Pp. xxi + 478. (Illustrated.) $1.25.

The reviewer does not know which power of ten to use, but certainly hundreds of living scientists date their interest in psychology from the time they first read James' *Briefer course*. Many will be interested to learn that this renowned text has been reprinted in The Living Library series under the general editorship of Carl Van Doren. No one is better qualified than Ralph Barton Perry to write an introduction to the volume. He refrains from giving us James as "the founder of modern psychology" but is certainly on safe grounds in claiming him as "one of the first to extend the methods and spirit of modern science to the human mind." James' well-known special contributions to psychology, his formulation of the maxims of habit, theory of emotions, and the doctrine of "the stream of consciousness," appeared in his *Principles of psychology*, published in 1890, and were incorporated in chapters in his *Briefer course*, published in 1892. But there was more to James than "special contributions." As later developments have revealed, he succeeded in organizing and expanding the psychology of the past so as to influence strongly subsequent psychology at many points. Prof. Perry briefly traces the reasons why James is considered the originator of "functional psychology," a father of Gestalt psychology, why he markedly influenced abnormal psychology, as well as guidance, educational, and religious psychology. Also, Prof. Perry in his introduction explodes the widely accepted tradition that James was first a psychologist, and later a philosopher.

In James' preface to this text he answers some criticisms of the arrangement of the chapters in his *Principles of psychology*. It seems evident from a footnote, which is a part of the original preface, that he gave much thought to the arangement of the chapter topics; he was not altogether happy in placing the subject of Sensation first. Further he says: "I feel now (when it is too late for the change to be made) that the chapters on the Production of Motion, on Instinct, and on Motion ought, for purposes of teaching, to follow immediately upon that on Habit, and that the chapter on Reasoning ought to come in very early, perhaps immediately after that upon the Self. I advise teachers to adopt this modified order, in spite of the fact that with the change of place of 'Reasoning' there ought properly to go a slight amount of rewriting."

It has often been forgotten that all of James' chapters except one were written for the textbook, not first for magazine publication, which was only an afterthought and resorted to "because the completion of the whole work seemed so distant."

The words "Briefer Course" appear only on the jacket. The original 66 diagrams are all reproduced in the present edition. The print is clear and beautifully legible, the paper is good, the volume is neat and of a convenient size, (lighter weight than the old one), and there is a 10-page index. Pleasure mixed with nostalgia arises from turning these familiar pages.

WALTER R. MILES
Yale University School of Medicine

Organic reactions. (Vol. IV.) Roger Adams. (Ed.-in-Chief.) New York: John Wiley; London: Chapman & Hall, 1948. Pp. viii + 428. (Illustrated.) $6.00.

This is the fourth volume of a series started in 1942 the general purpose of which was clearly set forth in the *Journal of the American Chemical Society*, 1942, **64**, 3062. The following eight subjects are discussed in an authoritative manner by authors who have had experience with the reactions they are describing: The Diels-Alder Reaction With Maleic Anhydride, by Milton C. Kloetzel (59 pp.); The Diels-Alder Reaction: Ethylenic and Acetylenic Dienophiles, by H. L. Holmes (114 pp.); The Preparation of Amines by Reductive Alkylation, by William S. Emerson (82 pp.); The Acyloins, by S. M. McElvain (13 pp.); The Synthesis of Benzoins, by Walter S. Ide and Johannes S. Buck (36 pp.); The Synthesis of Benzoquinones by Oxidation, by James Cason (57 pp.); The Rosemund Reduction of Acid Chlorides to Aldehydes, by Erich Mosettig and Ralph Mozingo (16 pp.); The Wolff-Kishner Reduction, by David Todd, (45 pp.).

Organic chemists will enthusiastically welcome this latest addition to the series. Certainly the remarkable reception given to the first three volumes will be accorded this one also; for the chapters have been carefully prepared and edited and the publisher has again assembled them in a very handy form and in the most attractive manner possible. Although there may be some who will quibble over possible inconsistencies in the nomenclature of the many individual compounds listed at the end of the various chapters and also may observe the omission of one or two references here and there, it is the opinion of this reviewer that the same high