the preparation and impregnation of paper, the choice of solvent systems, converting substances to forms more suitable for chromatography (such as converting acids to hydroxamic acids), preparing samples for chromatography, and carrying out quantitative analyses. These two sections are detailed and represent a valuable compilation of frequently needed data. Finally, there are author and subject indexes (39½ pages, each with two columns of entries).

Volume 2, an important adjunct to volume 1, contains a minimum of explanatory text and 10,290 bibliographic entries, each with author, title or indication of the subject dealt with, and reference. These are also organized into two main divisions: a general part (56 pages) and the special part which comprises the bulk of the volume. The special part is divided into chapters which deal with particular types of compounds, some of which have been added since volume 1 was published. Most of the chapters are further subdivided. For example, the chapter on organic acids is subdivided into general reviews, lower fatty acids, higher fatty acids, aliphatic hydroxy acids, di- and tricarboxylic acids, keto acids, phenolic and other cyclic acids, glycerides and other esters of organic acids. Most of these subdivisions are further classified in terms of techniques and applications, which are themselves further subdivided. This careful, logical organization makes the information extraordinarily accessible down to very narrow requirements. The volume concludes with a complete author index and an alphabetical index of substances that have been chromatographed. The references in volume 2 comprise four times as many substances as are referred to in volume 1.

Both volumes are printed on good paper in a clear and readable style. The illustrations in volume 1 are excellently chosen, and the authors do not avoid epistemological considerations where these are appropriate—that is, where such considerations help the reader to understand the reasoning behind the method. For all of these reasons the editors and authors are to be congratulated on providing paper chromatographers, from beginners to experts, with a first-rate text and reference work. I recommend the two volumes most highly.

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Quantitative Science

Experimental Immunochemistry. Elvin A. Kabat. With chapters by Manfred M. Mayer. Thomas, Springfield, Ill., ed. 2, 1961. xii + 905 pp. Illus. $26.50.

For those familiar with the 1948 edition of Kabat and Mayer, the publication of Kabat's new edition is an important event. Michael Heidelberger in the preview (an introduction) to the first edition predicted that *Experimental Immunochemistry* would be "more likely to gather acid spots and indicator stains on the laboratory table than to accumulate dust on the reference shelf," and I am prepared to produce the shreds of my second copy as the fulfillment of Heidelberger's prophesy.

Immunochemists and their forebears, immunologists, recognize that immunochemistry became a discipline in its own right through the brilliant and precise efforts of small groups of chemists and biologists to render quantitative an otherwise empirical science. The discipline, however, has evolved during the past decade into a bureaucracy, which even an author possessed of the breadth and clarity of Kabat finds impossible to treat fully in more than twice the linage of the first edition (900 two-column pages versus 550 single-column pages). Consequently, the author felt justified in omitting discussions of some newer offshoots of immunology, such as immunohistology and immunohematology, possibly because they do not as yet lend themselves to analysis by many of the precise quantitative methods with which the book is primarily concerned.

The original format has been preserved. There are four parts dealing with basic methodology and theory, applications, chemical and physical methods, and preparations. Several new chapters have been added to provide introductions to interim developments such as chromatography and measurements of radioactivity. Many chapters are greatly enlarged. The section on complement and complement fixation, by Mayer, is nearly three times more copious; it has new illustrations and tables. An excellent treatment of electrophoretic methods now includes discussions on the applications and limitations of various zone-electrophoresis techniques, including immunoelectrophoresis.

Gel-diffusion methods are now recognized among the most powerful tools available for analysis of complex antigen-antibody systems. They are treated extensively, but more from the theoretical than technical aspect. For the purposes of this book such a presentation is proper since the power and wide application of most techniques derive as much from their versatility as from their inherent physical or chemical qualifications. Because they are versatile, gel-diffusion methods have been modified in many ways by individual investigators to suit their particular problems.

The author's discretion in such matters demonstrates considerable insight into the basic questions which investigators pose for reference handbooks—for example: How can our results best be interpreted? Wherever appropriate, Kabat has provided theoretical and practical guideposts and danger signals in the application of physical and chemical methods to immunochemistry and in the use of immunochemical tools in approaches to biological or biochemical problems. In this respect *Experimental Immunochemistry* is not only an immunochemist's volume. It is a major contribution toward the advancement of the biochemistry of macromolecules, and it is to be highly recommended to all chemists and biologists whose fields are beginning to feel the impact of practical and theoretical immunochemistry.

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Chloroplast

The Life of the Green Plant. Arthur W. Galston. Prentice-Hall, Englewood Cliffs, N.J., 1961. 116 pp. Illus. $2.95.

This concise, up-to-date summary of the fundamentals of plant physiology is chiefly designed for use in introductory courses in biology, but it should also be an ideal complement to more comprehensive texts used for beginning courses in plant physiology.

The sequence of topics is essentially the same as that in the larger text, *Principles of Plant Physiology,* by Galston and James Bonner. The most noticeable changes in content are the omission of the details of intermediary metabolism (which is to be expected, considering the audience for which this "Foundations of Modern Biology Series" is designed), the addition of a chapter on the green plant cell, and the emphasis on plant growth, differentiation,