contributions to, the theory of adjustment of observations and of statistical inference, and it might have been well to take a quick look at this substantially developed field. Most of Wilks' discussion deals with the problems of precision, sampling, randomization, and the analysis of variance, as applied to chemical analysis or size distributions.

The longest chapter (58 pages), "Biologic problems relating to the composition and diagenesis of sediments," is by Heinz A. Lowenstam. The emphasis is on the chemical and mineralogical composition of marine organisms, as originally deposited and as transformed by later reactions. A large amount of information is presented, clearly of great importance for the history of the oceans and for the interpretation of the sedimentary record. It appears, however, that the large amount of work so far accomplished has chiefly served to unsettle the views of the past, without as yet leading to a satisfactory new synthesis.

FRANCIS BIRCH
Department of Geological Sciences, Harvard University

Methods and Techniques

Treatise on Analytical Chemistry. I. M. Kolthoff and Philip J. Elving, Eds. pt. 1, *Theory and Practice*: vol. 4, sect. D-1, *Magnetic Field Methods of Analysis*; sect. D-2, *Electrical Methods of Analysis.* Charles N. Reilley and others. Interscience (Wiley), New York, 1963. xxvi + 955 pp. Illus. $25.

Modern analytical chemistry is a field in the process of rapid development and expansion. To answer the needs of organic chemists, biochemists, biologists, and others who must apply analytical techniques and keep informed of developments in this field, several series—including one devoted to organic analysis, one on physical methods of analysis, and two treatises on analytical chemistry—are being published, and a very extensive handbook on analytical methods has just appeared. The aim of the treatise that includes the volume under review is "to present a concise, critical, comprehensive and systematic, but not exhaustive, treatment" of analytical chemistry. Few editors would embark on such an undertaking, and only those with the qualifications of Kolthoff and Elving, and their assistants, could be so successful.

This volume is the fourth of part 1, which deals with the theoretical principles and techniques of various analytical methods (part 2, an element-by-element survey of analytical methods, is being published simultaneously). In volume 4 (of part 1) magnetic field methods, including magnetic susceptibility measurements, magnetic resonance methods, mass spectrometry, and ion-scattering methods, are discussed in the first third of the book, and a review of electrical methods of analysis, including potentiometry, polarography, voltammetry, chronopotentiometry, coulometric methods, conductometry, and oscillometry, occupies the remainder. The chapters are uniformly good, and all of the authors are acknowledged authorities in their respective fields. Each chapter presents a clear description of the method under consideration, starting with elementary principles and leading up to the current status of the technique; complete references to the literature are given for those seeking more details. The content of every chapter is excellent, but a few deserve special mention. The two introductory chapters on electrochemical methods, by Reilley and Murray, who also served as editorial assistants for this volume, provide an excellent overall survey, classification, and correlation of these techniques. The chapters by Adams (on voltammetry at electrodes with fixed surfaces) and Shain (on stripping analysis) contain much material not previously reviewed. The lack of any extensive discussion of alternating current and square wave polarography, cyclic voltammetry, rotating disk electrodes, and adsorption and double layer effects in electrode reactions was my only disappointment with the editorial content of this volume, and this may be only a reflection of the time lag between submission of the individual chapters and eventual publication.

A few editorial policies deserve comment. If this volume had been divided into two separate ones, the part on electrical methods would have made an excellent textbook for a course in modern electroanalytical chemistry. But it is hard to ask a student to pay $25 for the present volume and then inform him that somewhat more than one-third of the text will not be used in the course. I still prefer to have the references placed at the bottom of the page, within the text, rather than at the end of the chapter. It is frustrating, especially when reading review chapters such as these, to hunt continually for references at the end of the chapter to determine whether (21) represents a new article or just a well-known monograph. The index, something lacking in previous volumes in this series, is especially welcome. All in all, while there has not been a deficiency of good books about these methods, this volume, as part of a treatise, does represent a good introduction to this portion of modern analytical chemistry.

ALLEN J. BARD
Department of Chemistry, University of Texas, Austin

Techniques and Applications

Thin-Layer Chromatography. James M. Bobbitt. Chapman and Hall, London; Reinhold, New York, 1963. xii + 208 pp. Illus. $8.50.

Thin-Layer Chromatography. Kurt Randerath. Translated by D. D. Libman. Verlag Chemie, Weinheim, Germany; Academic Press, New York, 1963. xiv + 250 pp. Illus. $8.

Both of these books emphasize the practical aspects of thin-layer chromatography, and to that extent they cover largely the same material. Thus, in each case, absorbants, layer preparation, sample application, development, and visualization are discussed. In addition, quantitative and preparative thin-layer chromatography are considered. In both books such general descriptions of techniques are followed by more or less detailed treatments of specific applications.

The appearance of such similar books at almost the same time invites comparison. Bobbitt, in general, employs an informal, almost conversational style. Randerath, on the other hand, makes use of a more conventional textbook style. The two books are actually very similar with respect to general arrangement and subject matter. Randerath employs running references at the bottom of each page,