

The Development of Titrimetric Analysis till 1806. E. Rancke Madsen. Gads, Copenhagen, Denmark, 1958. 239 pp. Illus.

The cover of this paper-bound, well-printed book attracts by the reproductions of old figures showing tubes and pipettes used in the early days of titrimetry. A look at the title may induce the question, Why till 1806? The full answer is given on page 195. In that year appeared Descroizille's article "Notices sur les alkalis du commerce," which is "a milestone in the development of titrimetry." "It is the first step towards assembling in one unity—titrimetric analysis—a number of different analytical methods which in their origin do not seem to have anything in common." It was to be followed by H. Schwarz, *Ueber die Massanalysen*. . . . (Braunschweig, 1850), the full title of which is listed in reference No. 287 (the last of the references bears the number 337).

Having thus started at the end of the book, we might go back to the beginning, of the book and of titrimetry, to Robert Boyle's "Experimental history of colors" (1663) and the use of lignum nephriticum extracts—the first known example of fluorescence—as indicators for acids and alkalies. It took about one hundred years before indication by color change was applied in titrimetry, although several descriptions of analysis by titration appeared in the meantime. Francis Home used the cessation of effervescence or the clearing of solutions from precipitates as indications, in 1756. In 1767, William Lewis relied on "the purplish blue paper used for wrapping sugar in" to show free acid or alkali at the end point of his titrations.

Methods for determining the alkaline strength of plant ashes, the concentration of vinegar, and the hardness of water; for following the purification of saltpeter from calcium and chlorides; and for measuring the then relatively new mineral acids of commerce were the practical aims of titrations by Wenzel, Bergman, Morveau, and almost all the great chemists of the 18th century. Indicators were extracted from flower petals, and since these are not available in winter, James Watt proposed red cabbage leaves as a source (1784). When Berthollet's chlorine bleach came into use, "strength" measurements were needed, and the redoximetric methods used for chlorine were adapted to the determination of dyestuffs. The assembly of pipettes and graduated glasses developed by Descroizille received the name "*le berthollet*" from him. Such methods became more frequently used, and the degree of purity was called "titre" by Macquer in 1778.

E. Rancke Madsen, professor at the Technical University of Denmark, reports about his very thorough study clearly and systematically. He gives extensive quotations, in the original language when this was English, French, or German and in translations from the Swedish. Particularly valuable features are his account of the experimental tests he carried out in accordance with the old descriptions and his interpretation of them in our scientific language. Together with his general discussion of quantitative analysis, these experimental data enhance the interest in the historical foundations of our methods. The book thus may become a valuable tool in the teaching of analytical chemistry—and, incidentally, in the teaching of French and German to chemists, through the meaningful and elegant examples provided in the many quotations.

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The Story of Life. H. E. L. Mellersh. Putnam's, New York, American ed. 1, 1958. 263 pp. Illus. \$3.95.

A scientist reviewing this book by a layman for laymen is stricken with ambivalence. He wants to praise and to promote it, but he cannot honestly do so without such qualification as may seem to be a condemnation. Here is a story that everyone should know: the evolutionary history of living things. It is set forth interestingly and clearly, although the style is somewhat uneven. The aim is certainly worthy: to instruct those willing to learn about evolution, to convince the dubious, and to reconcile the pious. And yet on most pages there is at least one statement that is not just right, not quite factually correct, not entirely representative of current scientific thought, not wholly free of unwarranted implications.

The author claims as an advantage that his language is "by no means always . . . strictly scientific." That does not explain or excuse innumerable sentences that are not true in detail and that could be made true with no loss of simplicity. "The ridge of plates along the back of the stegosaurus . . . may have served as protection against tyrannosaurus"—but *Stegosaurus* and *Tyrannosaurus* were not contemporary, by millions of years. "Hesperornis, a diving bird essentially similar to the modern bird in wings and tail"—but *Hesperornis* had no wings. "The insects we can dismiss summarily: they do not learn"—but they do learn. Those are average, not the most egregious, examples of a multitude of misstatements.

More subtle and at least as frequent

are phrases suggesting failure to grasp the essence of pertinent scientific methods and viewpoints; for example, "The species of Primate," where the Order Primates is meant; "Scientists are singularly free and easy with the Greek and Latin tongues and singularly unforthcoming in explanation of exactly what they mean when they use them . . . [A fossil animal] was christened *Proconsul* and the scientists have rather surprisingly accepted the title"; "The social insects . . . [obey] the law that Christians are expected to follow, of walking contented in that way of life into which it has pleased God to call them. . . . They do what they are created to do." Equally frequent are examples of the pathetic fallacy and of anthropomorphism, for which, indeed, there is occasionally an apology, but not often enough.

The crucial chapters on explanations of evolution divide these into "the orthodox" (Darwinism and so-called neo-Darwinism) and "the unorthodox" (neo-Lamarckism and vitalism, which are wrongly considered synonymous). That may be fair enough in itself, but it is not fair to the reader, while pretending a judicious neutrality, to imply strongly that "the unorthodox answers" are more likely to be true, and to bolster this by giving a highly inadequate and partly inaccurate summary of "the orthodox answers."

Might the anxious reviewer resolve his ambivalence by saying that the book is good over-all but not in detail? But perhaps that is too much like the curate's egg, which, after all, was bad only in detail.

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Methods in Enzymology. vol. IV. Sidney P. Colowick and Nathan O. Kaplan, Eds. Academic Press, New York, 1957. xii + 979 pp. Illus. \$24.

This book is the last of a series which attempts to provide a compendium of methods for the enzymologist. The earlier volumes, which by now are standard equipment in most biochemistry laboratories, covered the preparation and assay of enzymes and substrates. Volume IV is entitled *Special Techniques for the Enzymologist*.

This volume contains three main sections: "Techniques for Characterization of Proteins," "Techniques for Metabolic Studies," and "Techniques for Isotope Studies." As with the earlier volumes, the main sections consist of a number of individual articles written by recognized authorities. There is a total of 35 such papers, and the list of authors includes many of the outstanding workers in the

respective fields. For example, A. Tiselius writes on "Electrophoresis," F. H. C. Crick on "X-ray diffraction of protein crystals," F. S. Sjöstrand on "Electron microscopy of cellular constituents," K. Bloch on "Synthesis and degradation of labeled steroids," and A. A. Benson and M. Calvin on "Intermediates of photosynthesis."

Presumably due to limitations of space, a number of articles in this volume contain a review of general principles plus references to appropriate sources for detailed laboratory directions. On the other hand, when detailed directions for a method are given, as in the earlier volumes, only one of a number of commonly used techniques is usually covered. An example of this is the section on "Determination of amino acid sequence in proteins." R. R. Porter contributes a comprehensive manual on the use of fluorodinitrobenzene for this purpose. The pipsyl method is also described, but the Edman and hydrazinolysis methods are omitted.

The over-all quality of the book is very good. The review articles have sufficient detail to make them useful to the average biochemist who is not actually working in the field. Among the more detailed articles, the following should be particularly useful: "Techniques for assay of respiratory enzymes," by B. Chance, which covers mainly the sensitive spectrophotometric methods; "Micromethods for the assay of enzymes," by O. H. Lowry; and the section on "Synthesis and degradation of isotopically labeled compounds," which contains directions for making more than 150 preparations of interest to biochemists. The editors plan a supplementary volume to remedy deficiencies and revise outdated procedures.

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Biochemical Cytology. Jean Brachet.
Academic Press, New York, 1957.
xi + 516 pp. Illus. \$8.80.

This book is the outcome of a series of lectures given by the author at the Indian Cancer Research Centre in Bombay in 1956, as well as lectures to his own students at the University of Brussels. It is intended for rather advanced students and investigators who have much background knowledge of biology and chemistry, including descriptive cytology, biochemistry, embryology, and genetics. The book is written in a very direct and clear style. This is particularly impressive inasmuch as English is not Brachet's native language. For help in this and other aspects of the work he acknowledges the assistance of A. R.

Gopal Ayengar, H. Peters, W. A. Jensen, R. Logan, and P. Couillard.

The field that one may designate as biochemical cytology has been developing rapidly and extensively in recent years. An up-to-date text in this important area of biology is, therefore, most welcome and useful to all students and investigators whose interests impinge thereon. Brachet has succeeded admirably in including the most current research in this field. In fact the references listed are largely to publications appearing within the last three or four years. This work also has the merit of having been written by one who has long been active in research in this field and who has made some of the most important contributions to it. The opinions and estimates that he gives of the significance of the work of others are thus largely based on firsthand experience with the materials and techniques.

Brachet does not present a definition of "biochemical cytology," but in a sense the contents of the book serve to indicate what he considers mainly to comprise the domain of this field. Some idea of the scope of the work may be obtained from the chapter titles, which are as follows: "The recent history of biochemical cytology"; "Brief survey of the techniques"; "The cytoplasm of the resting cell"; "The nucleus of the resting cell"; "Mitosis"; "Nucleic acids in heredity and protein synthesis"; "Nucleocytoplasmic interactions in unicellular organisms"; "The nucleus and cytoplasm in embryonic differentiation"; and "Remarks on cancer cells." There is a final short chapter, called "Final remarks," in which the difficulties in defining "life" are discussed in relation to cell fragments and cell constituents.

Throughout the text Brachet has paid particular attention to the nucleic acids. Such attention is certainly merited in view of the great advances that have been made concerning the role of these substances in heredity and protein synthesis and in view of the considerable research activity in this field. These substances provide, to a large extent, a central and integrating theme for the extensive biochemical and modern morphological studies that are reviewed. One might think of a number of topics that are not discussed, or that receive scant attention in the text, and that could be considered a part of this field. For example, current research on collagen and on myofibrillae provides excellent and interesting material for discussion of correlations between biochemistry and structure. Another topic of great current interest is that of the abnormal hemoglobins, which would seem as appropriate for discussion under biochemical cytology as under biochemical genetics. However, one certainly cannot hope to find included in a text of reason-

able size, written by one author, all that might be considered a part of a field that encompasses as much of biology as biochemical cytology does. The author has done an excellent job of bringing together, in a well-coordinated and integrated form, most of the research that is of special current interest in the new cytology.

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Doctor and Patient in Soviet Russia.
Mark G. Field. Harvard University Press, Cambridge, 1957. xviii + 266 pp. \$5.

Reviewing a book on medicine in the Soviet Union is beset with dangers common to all studies of the Soviet system: "failure explicitly to condemn is viewed by some as tantamount to approval, and failure explicitly to praise is taken by others as the equivalent of criticism."

This is a serious study by a serious student of Soviet matters. The author is not a physician and stays close to the sociological study of the doctor and the patient and their interrelationship within the Soviet system. He does not undertake to deal with the technical aspects of the practice of medicine, or with such related topics as postgraduate training and medical research. One could wish that the book had been based on more extended personal observation than that provided by a month's tour in the Soviet Union and that interviews with refugees did not represent so important a proportion of the total information, upon which some deductions are, inevitably, framed. These shortcomings are recognized clearly by the author and should be remembered as clearly by the reader.

For me, the most penetrating insight into the role of the physician in the Soviet Union was derived from a sentence on page 26: "his living conditions, his satisfaction and dissatisfaction, the importance given the kind of services he dispenses, and even the sex composition of the profession resemble to a striking degree those of the elementary and secondary school teacher in the United States."

The book deserves careful reading by physicians and, for that matter, by patients, including those of professional calling. An exposition of this kind should yield a greater understanding of Soviet medicine and its relation to the Soviet system as a whole, and perhaps even some useful reflections about American medicine and its role in our social structure.

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