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.

EDUARD FARBER

Washington, D.C.

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.

G. G. SIMPSON

American Museum of Natural History

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