that we were somewhat "put out" by finding no reference more recent than 1958 to our own work on neurochemistry and behavior. Indeed the authors seem to have been determined to avoid any discussion of data, and any speculation (their own or that of others), bearing on the fundamental questions of neurochemistry and behavior. That is why the book sometimes takes on the flavor of a medical "annual review" and fails to provide, as it might have, what is so much needed, and what, indeed, the authors lead us to believe we will find—a good, hard look by competent scientists across their disciplines. A good, hard look would almost have to be somewhat speculative. It would have to ask such questions as "*Why* do that?"; "*Why* do we want to know that?"; "*Where* shall we look?" The field of biochemistry-and-behavior is so new that the *first* answers to such questions will almost necessarily be speculative. Any book written now can only provide first answers.

There is, perhaps, another reason why we wish an experimental psychologist had been added to the mix. We have already referred to the book's admonitions to would-be experimenters —admonitions definitely called for and admonitions well worth heeding. But most such critical comments in the book are addressed to the psychologist. This, in our experience, seems a bit one-sided. The problem of doing good interdisciplinary work in chemistry and behavior is not altogether that of taming the psychologist. The biochemist, too, finds his techniques wanting and his methods a bit fuzzy when he addresses himself to problems of the relations between biochemical events and behavior. He frequently discovers that the psychologist needs quantitative biochemical data rather than information that such and such a compound is present or absent—and the biochemist does not immediately have the techniques needed to supply such data. He frequently finds that the psychologist is seriously and insistently concerned with individual differences and that he demands of the biochemist precise measurements of individual (not "pooled") brains or livers. The biochemist finds that his techniques must be refined and refined to meet these new demands. And further, because of the ubiquity of individual differences, the psychologist refuses to rest content with the data from one animal, or two animals, or even three animals—he wants data from many animals, many times repeated. The biochemist finds that his ordinary techniques are too time consuming, too laborious, and too expensive, and he must seek to develop new techniques. Unfortunately, there is no hint of these problems in *Biochemistry and Behavior.* There is very little suggestion that in this cross-disciplinary enterprise both disciplines must solve new internal problems.

We have been unfair. It is unfair to castigate the authors for having written their own book rather than the kind of book we would like to see written. But, to repeat what we have said above —this book has so many virtues, and will (and should) be read by so many, that we only wish it had yet a few more virtues.

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Analytical Chemistry

Principles and Methods of Chemical Analysis. Harold F. Walton. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1964. xviii + 484 pp. Illus. $10.95.

This work represents an extensive revision and a moderate enlargement (from 435 pp.) of the well-known first edition published in 1952. To quote from the preface, "This book is about the 'chemistry' in analytical chemistry. It is devoted to the thesis that chemical reactions and chemical separations will continue to be important to the analyst for many years to come."

Changes from the first edition include new chapters on precipitation from homogeneous solution, solvent extraction, acid-base titrations in nonaqueous solvents, and "linear" titration methods. The sections on complexometric titrations and ion-exchange separations have been rewritten. The chapter on electrolytic methods of analysis has been dropped, but some of its contents have been incorporated into the new chapter on linear titration methods.

The selection of topics in a book such as this is inevitably arbitrary to some extent. A topic as important as analysis based on reaction kinetics is not included, although catalyzed reactions and induced reactions are briefly discussed. Separations, which constitute such an important part of analysis, may be based upon chemical or physical behavior, or upon a subtle combination of both. The author has chosen to include liquid-liquid extraction, including multiple and countercurrent extraction, but to exclude column chromatography, both liquid-liquid and liquid-gas. Ion-exchange columns, however, are treated. Again, the chapter entitled "Separations by vaporization" includes examples involving chemical change (SiF_4 evolution, methyl borate distillation, microcombustion, and the like), and even the Schöniger oxygen flask method, which hardly involves separations at all. Electrolytic separations are barely touched upon.

The strongest features of this book are the descriptions of organic reagents as precipitants, extractants, and chelating reagents. Both the time-honored reagents and new ones are described in admirable fashion.

The weakest features are the treatments of electrode phenomena, particularly irreversible phenomena and electrolysis. The very useful concept of formal potentials is not introduced until the very end of the chapter entitled "Oxidation-reduction potentials" so that its utility—for example, in discussing titration curves—is not brought out. Electrode polarization is defined as "any impediment to the flow of a steady current over and above the ohmic resistance" (p. 428). At best, such a definition will cause confusion between polarization (measured in volts), polarization resistance, and film resistance (measured in ohms).

There is an occasional tendency to oversimplify which leads to confusion or error. Writing cerium (IV) as Ce^{++++}, for example, is apt to lead the student to serious misinterpretation if he attempts to reason from principles.

In summary, this book is a welcome revision and updating of a pioneering work in an often neglected field. With its smooth easy-to-read style, it should serve well as a textbook for or supplement to beginners' courses in quantitative chemistry, and as an introduction to more advanced treatments of these subjects.

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