

Many pages are devoted to reaction equations, which should in the most part have been left to the student to work out. There seems to be little to stimulate the chemical imagination of the student, or to arouse any eager desire for a more advanced and penetrating study of chemistry, all of which could and ought to be accomplished in qualitative analysis without any loss, but rather a gain, of reliability. The personal influence of the instructor may accomplish in part, at least, what appears to be missing in the spirit of the book.

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**Outlines of Qualitative Chemical Analysis.** By FRANK AUSTIN GOOCH, Professor of Chemistry in Yale University and PHILIP EMBURY BROWNING, Assistant Professor of Chemistry in Yale University. New York, Wiley & Sons; London, Chapman & Hall, Limited, 1906. vi + 145 pp.

This book, according to the preface, forms "a brief outline of methods in qualitative analysis, the outcome of many years' experience in teaching college. While it has been prepared to meet the requirements of that larger class whose concern is chiefly with the disciplinary side . . . . . the needs of the specialist in exact analysis have likewise been considered." As a short text on systematic analysis, a book emanating from the above authors could not be other than reliable, exact and clear in practical detail: Some interesting departures from common procedure seem worthy of more general adoption and some methods have been made more exact and reliable in execution. The theoretical treatment is exceedingly slim and is practically limited to a brief introductory chapter, in which it is satisfying to find emphasis laid on the reversibility of analytical reactions and the rôle played by the law of mass action in developing a correct analytical procedure. But the student will look in vain for any detailed application of the law on the basis of the modern views concerning the nature of solutions. It is the experience of some that such a theoretical treatment not only greatly increases the interest of the student and enlarges his chemical horizon, but it also enhances very much the disciplinary value of the study by the greater demand made on a student's thinking power and logic, rather than on memory alone. In the proper hands, with a better scientific understanding, gain rather than loss in analytical reliability should also follow.

Pages of equations are given in the book which, to a very large extent, should better be left to the student to work out on the basis of general theoretical instruction.

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**Qualitative Analysis, vom Standpunkte der Ionenlehre.** DR. WILHELM BÖTTGER, Privatdozent und Oberassistent am Phys. Chem. Institut der Universität Leipzig. Second revised and much enlarged edition. With 24 illustrations, a table of spectra, and separate tables for use in the laboratory. Leipzig: Wilhelm Engelmann, 1908. xvi + 524 pp. Price, 10 marks.

In this book we have a very thorough and elaborate presentation of the subject of qualitative chemical analysis. It includes both the