Qualitative Analysis for Secondary Schools. By Cyrus W. Irish, A.B. (Harvard), Head master of the Lowell High School, Lowell, Mass. American Book Company.

The preface of this book states that in secondary schools "the first half of a one year's course in chemistry should be devoted to a general introduction to the theory of the science and to a close study of the most common non-metallic radicals. The second half-year should deal with basic radicals and should be combined with the study of Qualitative Analysis." It is to supply a manual for the latter part of such a course that this little book has been written.

The laboratory work begins with a series of experiments, illustrating the classification of the bases into analytical groups. Metals are selected as typical of the various groups, and the action of each group reagent, in turn, upon a solution of a salt of each of these metals is studied. The metals of a group are then taken up in order, preliminary experiments being followed by a few well-chosen questions on the experiments and on the occurrence, preparation, uses, etc., of the element under consideration and its compounds.

The directions for the analysis of a group are followed by a table outlining, by the use of formulæ, the chemical changes which take place in the course of analysis. In the reviewer's opinion the preparation of such a table by the student himself, from the data secured in the preliminary experiments, is much better and is one of the most profitable exercises which can be given him. In this manual the table is followed by 'notes and suggestions' which are altogether too brief. Space might have been gained for the expansion of this part of the book, by the omission of lithium and all but the more common inorganic acids.

As is usual in manuals of qualitative analysis, the section devoted to the acids is unsatisfactory. In the test for an acid, the behavior of other acids under the prevailing conditions is disregarded. The most convenient method of preparing a solution for the detection of the acids, viz, treatment of the substance with sodium carbonate, is not directly mentioned, while there is given in full the preliminary examination of the solid substance, the results of which, in the case of mixed substances, can only be interpreted by the more advanced student.

The methods used for the separation of the bases are for the most part well-chosen. Most teachers would prefer, however, to adopt for high-school students methods for the separation of nickel from cobalt and of copper from cadmium, which do not involve the use of potassium cyanide. The directions for the precipitation of the copper group (p. 36) are faulty in that they favor the incomplete transformation of mercuric compounds into the black sulphide, which will frequently result in a precipitation of mercuric sulphide in the final test for cadmium. On page 42 occurs this misleading paragraph, "Boil stannous chloride with concentrated nitric acid. This converts the stannous chloride into stannic chloride."

The introductory chapter lacks the lucidity of style which should characterize an elementary text-book. The statements, "the specific name of a salt is the name of the basic radical changed to an adjective" (p. 8), and "substances that are in solution can be separated by addition of such a reagent as will form a new substance that is insoluble in the fluid" (p. 12) will surely appeal to the high-school pupil as little as does the following prescription to the chemist, "for Alkali Burns, apply acetic acid diluted with water so that to the taste it is about one-fourth as sour as vinegar. This solution may be safely applied to the eye" (p. 15).

Notwithstanding these faults, the book might produce good results in the hands of an experienced teacher of chemistry. Whether a year's course in chemistry in a secondary school may not be profitably spent in a thorough and extended study of what is usually called general chemistry to the exclusion of anything more than the merest elements of qualitative analysis, is another question.

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The Psychology of Religion. An Empirical Study of the Growth of Religious Consciousness. By Edwin Diller Starbuck, Ph.D., As-