telligent interpretation of results and on the cultivation and development of habits of observation.

There are some points on which the author has either not laid enough stress or where a better method of procedure might have been offered. The difficulties produced by the simultaneous presence of chromium and zinc are not mentioned, and it would have been much better to have given here, as an alternative method, the barium carbonate process, not only for the separation of zinc from chromium, but also for the separation in the presence of phosphates. Again the Fresenius method for separating small amounts of barium, calcium and strontium would prove more accurate than the separation by means of potassium chromate and acetic acid. The preliminary tests and operations necessary to get a substance into solution are systematically treated, but no mention is made of fusion with acid potassium sulphate. There are two portions of Book I. which reflect on the intelligence of the student, and the book would have been much better without them, viz.: the tables at the end of each chapter giving an outline of the process; and Chapter I., which treats of filtration, solution, evaporation, fusion, precipitation, ignition and neutralization, processes, which properly belong to experimental general chemistry. If the student had not already been over the ground here given he would not be fitted to begin qualitative analysis.

There will undoubtedly be a difference of opinion concerning that portion of the book devoted to quantitative analysis, particularly in regard to the selection of the gravimetric analyses and to the details necessary to carry them out. After the preliminary operations of weighing and preparation of pure salts the gravimetric determination of the more common metals and acids is studied in detail, and then follows a chapter on the determination of the constituents of silver coin, solder, German silver, bronze, dolomite, zinc blende and an insoluble silicate containing the alkalies. The well known typical methods of volumetric analysis are given. By excluding many descriptive details and by conciseness and clearness of expression the author has condensed a great deal into this portion of the book, which, if followed under the guidance of an instructor, should give any student a good general knowledge of quantitative methods.

Following the gravimetric and volumetric methods, the physico-chemical methods for the determination of specific gravity, boiling point, melting point and vapor density are given. The author could very advantageously, and should, have included here the determination of molecular weights by boiling- or freezing-point methods, and then followed it by a brief *résumé* of the more recent applications of theoretical chemistry to quantitative analysis. Such a chapter would have been in harmony with the rest of the book and would have increased its value greatly.

In his preface the author says, "I have carefully avoided the use of those symbolic abbreviated expressions, such as $H_2\bar{O}$ (oxalic acid), $H_2\bar{T}$ (tartaric acid)," etc., and nevertheless he uses the formula 'Cy' instead of CN, offering as an excuse that 'Cy' is a recognized and convenient symbol for the radical (CN) cyanogen. He is further inconsistent in the uses of the doubled formulæ for the hydroxides of iron, chromium and aluminium, as $Fe_2(OH)_6$, etc., while perhaps in the same equation he will use the single formula for the chloride FCl_3.

The author it seems takes unusual precautions in igniting filter papers apart from the main portion of the precipitate. This tedious operation might have been avoided in many cases by the use of the Gooch crucible, which receives no mention.

As a whole the book is remarkably free from objectionable points, and is a distinct advance in the scientific treatment of analytical chemistry.

HENRY FAY.

RECENT PUBLICATIONS OF THE U. S. GEOLOGICAL SURVEY.

THE following bulletins have been recently issued by the U. S. Geological Survey:

Bulletin 89. 'Some Lava Flows of the Western Slope of the Sierra Nevada, California,' F. L. Ransome.

The author describes a series of lava sheets, one of which forms the celebrated Table Moun-

tain, in Tuolumne county, California, and which has been usually described as basalt. The rocks are intermediate between the trachytes and andesites and are specially named 'latites.' Inasmuch as six other names have already been proposed for rocks of this general character, the author had a magnificent opportunity to resist the temptation to make a new one.

Bulletin 149. 'Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy for 1896,' F. B. Weeks.

This bulletin continues the excellent series already represented by Nos. 127, 130, 135 and 146.

Bulletin 150. 'The Educational Series of Rock Specimens, collected and distributed by the U. S. Geological Survey,' J. S. Diller.

The petrography of the series is set forth by Mr. Diller and others. The work will be more fully reviewed elsewhere in SCIENCE.

Bulletin 151. 'The Lower Cretaceous *Gryphæas* of the Texas Region,' R. T. Hill and T. W. Vaughan.

This Bulletin has been reviewed in SCIENCE for January 20, 1899 (p. 110), by Professor Frederic W. Simonds.

Bulletin 152. 'Catalogue of the Cretaceous Plants of North America,' F. H. Knowlton.

Bulletin 153. 'Bibliographic Index of North American Carboniferous Invertebrates,' Stuart Weller.

Bulletin 154. 'A Gazetteer of Kansas,' Henry Gannett.

Bulletin 155. 'Earthquakes in California in 1896 and 1897,' Charles D. Perrine.

Bulletin 156. 'Bibliography and Index of North American Geology, Paleontology, Petrology and Mineralogy for 1897,' Fred. B. Weeks.

The titles of Nos. 152–156 inclusive indicate the contents.

THE Macmillan Company announce the early publication of the second part of Dr. Davenport's 'Experimental Morphology, which treats of the effect of chemical and physical agents upon growth. They also announce 'A History of Physics; in its Elementary Branches Including the Evolution of Physical Laboratories' which has just been completed by Florian Cajori, Ph.D., professor of physics in Colorado College and author of 'A History of Mathematics.'

THE Open Court Publishing Company have now in press the 'Principles of Bacteriology,' by Professor Ferdinand Hueppe, of the University of Prague, translated by Professor E. O. Jordan, of the University of Chicago.

BOOKS RECEIVED.

Hand-book of Metallurgy. CARL SCHNABEL. Translated by HENRY LEWIS. London and New York, The Macmillan Company. 1898. Vol. I., pp. xvi + 876. Vol. II., pp. xiv + 732. $10.00.

A Guide to the Study of the Geological Collections of the New York State Museum. FREDERICK J. H. MERRILL. Albany, University of the State of New York. 1898. Pp. 207 + 65 plates. 40 cents.

Earthenware of the New York Aborigines. WILLIAM M. BEAUCHAMP. Albany, University of the State of New York. 1898. Pp. 76 + 142. 245 illustrations. 25 cents.

The Last Link, our present Knowledge of the Descent of Man. ERNEST HAECKEL. London, Adam and Charles Black; New York, The Macmillan Company. 1898. Pp. 156. $1.00

The Principles of Stratigraphical Geology. J. E. MARR. Cambridge, The University Press; New York, The Macmillan Co. 1898. Pp. 304. $1.60.

Society for the Promotion of Engineering Education Sixth Annual Meeting, Vol. VI. Edited by T. C. MENDENHALL, J. B. JOHNSON and A. KINGSBURY. Published by the Society. 1898. Pp. xxvii + 324.

Traité de zoologie concrète. YVES DELAGE and EDUARD HÉROUARD. Vol. VIII., Les procordes. Paris, Schleicher Frères. 1898. Pp. vii + 379.

SCIENTIFIC JOURNALS AND ARTICLES.

THE New England Botanical Club has established a journal to encourage the study of the local flora. It has been given the name *Rhodora* and will be published monthly at 740 Exchange Building, Boston. The editor-in-chief is Mr. B. L. Robinson, with Messrs. F. S. Collins, M. L. Fernald and Hollis Webster as associate editors. The first number, which contain twenty pages and two plates, opens with an editorial announcement, followed by a number of inter-