

understood by the general reader. It is in no sense a technical book, though it describes a number of chemical processes and discusses some of the more important theories and laws.

Beginning with a brief account of the scope of chemistry and its historical development, including the phlogiston theory and Lavoisier's experiments on combustion, the author continues through a total of thirteen chapters in which are discussed such subjects as oxygen, water, acids, bases and salts, lime, carbon, fuels, nitrogen, nitric acid, sulfur, and salt. Among the principles and laws are included the laws of constant composition and multiple proportions, the atomic and ionic theories, the Brownian movement, the existence of molecules, the Periodic Law and atomic structure.

The book is well and entertainingly written. The discussions of the existence of molecules, the calculation of atomic weights, and the structure of the atom are especially clear and easy to follow. Taken as a whole the book shows the importance of chemistry to everyday life in the contacts that it makes and should be of especial value to general science teachers.

GEO. W. SEARS

Handbook of Scientific and Technical Societies and Institutions of the United States and Canada. *Bulletin of the National Research Council*, No. 58. American section compiled by CLARENCE J. WEST AND CALLIE HULL. Canadian section compiled by National Research Council of Canada. First edition. National Research Council, Washington, D. C., 1927. 304 pp. 17 X 24.5 cm. Paper, \$3.00; Cloth, \$3.50.

"The purpose of this publication is to present a ready guide to those scientific and technical societies, associations, and institutions of the United States and Canada which contribute to knowledge or further research through their activities, publications or funds. The tendency has been towards a broad inter-

pretation of these requirements, and the list, therefore, is not to be regarded as a selective one. Only those government institutions are included which administer private funds. Organizations directly controlled by universities or colleges have been omitted because it is expected that they will be covered by the forthcoming publication 'American Universities and Colleges,' to be issued by the American Council on Education."

Industrial Research Laboratories of the United States Including Consulting Research Laboratories. *Bulletin of the National Research Council*, No. 60. Compiled by CLARENCE J. WEST AND ERVYE L. RISHER. Third edition, revised and enlarged. National Research Council, Washington, D. C., 1927. 153 pp. 17 X 24.5 cm. Paper, \$1.00.

"The continued demand for information regarding industrial research laboratories has made it seem advisable to issue a second revision of the list originally published in Number 2 and revised in Number 16 of the *Bulletin of the National Research Council*. The original publication, compiled in 1920 by Mr. Alfred D. Flinn, Secretary of the Engineering Foundation, listed about 300 industrial laboratories. The first revision prepared in August, 1921, by Miss Ruth Cobb of the Research Information Service, listed 526 laboratories. The present revision contains data for 1000 laboratories.

"As in the earlier lists, all information given in this publication has been obtained directly by correspondence and statements are based upon information supplied by the laboratories. An endeavor has been made to follow the phraseology of the laboratories wherever possible; the names are given in the style used by the company with regard for spelling and abbreviations. No investigation has been made to ascertain the character of any laboratory listed, nor the quality of the work done."

Laboratory Layouts for the High-School Sciences. *Bureau of Education Bulletin*

tin, No. 22. A. C. **MONAHAN**. Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 1927. v + 31 pp. 15 X 23 cm. 13 illustrations. Paper, \$0.10.

Includes discussion of layouts, equipment and stock for chemistry, physics, biology, and general science laboratories.

Grain through the Ages. GRACE T. **HALLOCK** AND THOMAS D. WOOD, M.D. Illustrated by Jessie Gillespie. The Quaker Oats Company, Chicago. Illinois, 1927. 96 pp. 13.5 X 18.5 cm. 8 illustrations. Free.

A companion booklet to "Hob O' the Mill," published in 1926. Suitable for younger school children. Frankly intended to advertise Quaker Oats but educational in content and presentation.

List of References on Higher Education
Bureau of *Education Library* Leaflet,

No. 35. Prepared in the Library Division, JOHN D. **WOLCOTT**, Chief, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., Sept., 1927. 40 pp. 14.5 X 23 cm. Paper, free.

Trends in the Development of Secondary Education. Bureau of Education Bulletin, No. 26. **EUSTACE E. WINDES**, Superintendent of Documents, U. S. Government Printing Office, 1927. 41 pp. 14.5 X 23 cm. Paper, \$0.10.

The Industrial Medicine Chest. **Abbott** Laboratories, North Chicago, Illinois, 1927. 30 pp. 13.5 X 19.5 cm. Paper free.

Filtration in Chemical Laboratories. Carl Schleicher & **Schull**, New York, 1927. 63 pp. 14.5 X 21.5 cm. Paper, free.

Transmutation of Elements May Supply Earth's Heat. The heat of the earth as used in mountain building, the melting of rocks into lava, and that which is radiated into space, may come from the evolution or transmutation of one element into another. This is the suggestion recently made to the National Academy of Sciences by Dr. W. V. Howard of the University of Illinois.

Dr. Howard's studies have been concerned with the odd-numbered elements, that is, the elements that have odd numbers when arranged in the orders of their weights, beginning with hydrogen, the lightest, as number one. This number of an element is called its atomic number. Many elements consist of mixtures of what the chemist calls isotopes. The isotopes of a given element are all the same element but their atoms have slightly different weights. Dr. Howard has worked out a series of rules by which the isotopes of elements that have not yet been successfully divided may be predicted.

These relationships together with his experimental results lead Dr. Howard to think that the odd-numbered elements may have actually been formed from the lightest isotopes of the even-numbered elements. According to modern ideas of the structures of the atoms of matter, this could be accomplished by the loss from the first element of a proton to form an atom of hydrogen, while the atom remaining would be that of an odd-numbered element.

As the process would be accompanied by the liberation of heat, Dr. Howard thinks that this is sufficient to account for much of the earth's heat.—*Science Service*