

will obtain only a partial view. The whole series will be equivalent to a single volume of about 120,000 words, but will compare unfavourably with such a volume in unity and coherence. It is unfortunate that there is so much freedom of choice and so narrow a range of price in books for elementary schools; for unless we can have a more definite practical aim in this and other types of education we must expect variety of training and outlook to give us a babel of tongues instead of a clear, resonant voice upon matters of national welfare.

OUR BOOKSHELF.

The Thermodynamic Properties of Ammonia.

Computed for the use of Engineers from new experimental data derived from investigations made at the Massachusetts Institute of Technology. By F. G. Keyes and R. B. Brownlee. Pp. v+73. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 4s. 6d. net.

THIS book contains the results of an experimental investigation carried out during the course of several years in the Research Laboratory of Physical Chemistry of the Massachusetts Institute of Technology. The object of the research has been to determine the vapour-pressure curve and the specific heat-capacity of liquid ammonia and the isotherms of the substance, so that the already existing data might be critically examined and supplemented and the results obtained used as a basis for the computation of a new table of the thermodynamic properties of ammonia which would prove useful in controlling the performance of refrigerating machines.

The first part of the book deals with the fundamental thermodynamic relations and a discussion of the data and the computations. The various formulæ involving the relations between the entropy, Gibbs's heat-function, the latent heat, the specific heats along the saturation line, the ordinary specific heats, etc., are obtained and tabulated for convenience. There are discussions on the methods employed to calculate the heat of vapourisation, the specific heat of liquid ammonia, and the entropy and specific heat of ammonia vapour.

The second part of the book gives some forty pages of tables, in which the thermodynamic properties of the saturated and superheated vapour are given with the temperature as independent variable in one set and the pressure in another. A Mollier diagram, in which heat-content is plotted against entropy, is added at the end of the volume.

The book should prove of the greatest service in engineering practice, especially for those who have to deal with refrigerating machines. The tables are given in a very convenient form, and the explanatory matter at the beginning is adequate and lucid.

J. R.

NO. 2448, VOL. 98]

The Journal of the Institute of Metals. Vol. xv. Edited by G. Shaw Scott. Pp. viii+392. (London: Published by the Institute of Metals, 1916.) Price 21s. net.

THIS volume contains the papers presented at the annual meeting of the institute, with the discussion and correspondence to which they gave rise, together with abstracts of papers relating to the non-ferrous metals and the industries connected therewith. Among the papers is the Third Report to the Corrosion Committee, of which an account was given in NATURE on April 6. The paper by Mr. Withey on the analysis of aluminium and its alloys is a very good piece of work which will probably constitute the standard of reference for some years. The aluminium of to-day is liable to contain copper, iron, zinc, silicon, silica, nitrogen, and sodium. It contains notably more copper than the metal produced ten years ago, but in other respects is a purer metal.

Prof. Stansfield's paper on electric furnaces as applied to non-ferrous metallurgy contains much interesting and valuable information. Furnaces are classified under two main headings: (a) those in which metals are reduced from their ores; (b) those in which metals are heated, melted, refined, and distilled. The former are electrolytic furnaces, and are used for the production of metals by the electrolysis of their fused salts. Aluminium, sodium, potassium, magnesium, calcium, barium and strontium are produced largely, if not exclusively, in this manner; and other metals, such as zinc, are occasionally so obtained. The latter are electrothermic smelting furnaces, and are used for the production of metals from their ores with the aid of electrically generated heat. Occasionally the metal is present in the ore in the native state, but usually it is found as an oxide or other chemical compound, from which it must be liberated by a chemical reaction involving the use of carbon or some other reagent in addition to the necessary electrical heat.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Science in Education.

WE hear much of the place of science in education, but it seems sometimes as if its advocates would say: "When I mention science I mean experimental science, and not only experimental science, but industrial science, and not only industrial science, but paying science"—to paraphrase Thwackum.

Let us look at the French conception of science, as summarised in two fat volumes describing its progress in France, for the San Francisco Exhibition. In one volume are philosophy, sociology, education, mathematics, astronomy, physics, chemistry, mineralogy, geology, palæontology, biology, medicine, and geography. In an equal volume are Egyptology, classical