remain for all time one of the great classics of science, a source of perpetual delight and inspiration to all true philosophers. He who drinks at such fountains can never grow old, for the clear waters that flow therefrom are the true elixir of the human spirit. F. G. DONNAN.

PHYSICAL AND CHEMICAL CONSTANTS.

Tables Annuelles de Constantes et Données Numériques de Chimie, de Physique et de Technologie. Vol. i., année 1910. Pp. xxxix + 727. (Paris: Gauthier - Villars; Leipzig: Akademische Verlagsgesellschaft m.b.h.; London: J. and A. Churchill; Chicago: University of Chicago Press.) Price 24*s.* net (cloth); 21*s.* 6*d.* net (paper).

THIS somewhat ponderous volume is the first of a series of the same character it is proposed to publish annually. It comprises a compendium of those constants of physics, chemistry and technology which result from researches published during the year 1910. The volume would appear to bear to Science Abstracts and the Abstracts published by the Chemical Society about the same relation as a dictionary to an encyclopædia. It is compiled under the auspices of an international committee, on which Dr. Wilsmore is the British representative, aided by a number of collaborators and abstractors, the general secretary of the committee and editor-in-chief being Dr. C. Marie, of Paris.

To review and criticise such a work is not easy, and it would be manifestly unfair to treat the volume like a book of tables, looking in it for information on definite subjects and commending or blaming according as one found or did not find what was required. We have some doubt, however, whether any considerable number of workers will be willing to purchase some large book of constants, such as the well-known "Landolt and Börnstein," or the late Mr. Castell-Evans's Chemical-Physical Tables, and use the present publication as an appendix to the same.

The volume is printed on good paper, but a good deal of space seems to have been wasted, making the book extremely bulky. On the whole, it seems fairly easy to ascertain from it whether, during the year it covers, any additions were made to our knowledge in any of the branches dealt with. Pure chemistry, and in particular organic chemistry, occupies a large share of the 727 pages composing it, and it is probably to the chemist rather than to the physicist that it will be of most use. Like most other books of tables, it is quite uncritical in character, and we doubt the utility of a bare statement, such as, for example, that found on p. 227: "Cuivre pur—variation de la résistance en pour cent a 20° = 0 3938," with no details as to the state of the metal or why the constant quoted differs so widely from the accepted value; but, nevertheless, we think that on the whole the work of the abstractors seems to have been conscientiously done.

The English of the book savours in places of an old-fashioned French exercise book; the English translations of French terms used have a look in some instances of having been dug out of a dictionary of the Early Victorian period. Throughout the indexes and in some other places German, English, French, and Italian equivalents are given for titles, etc., but in the body of the work the language used is generally French. Better indexes to the present volume than those which are given are needed, and are promised in the 1911 issue. J. A. HARKER.

TWO BOOKS ON NAVIGATION.

(1) *Nautical Astronomy.* By W. P. Symonds. Pp. 130. (London: J. D. Potter, 1912.) Price 6*s.*

(2) *The "Newest" Navigation Altitude and Azimuth Tables for Facilitating the Determination of Lines of Position and Geographical Position at Sea.* Second edition. By Lieut. R. de Aquino. Pp. xlix + 176 + v* + 36*. (London: J. D. Potter, 1912.) Price 10*s.* 6*d.* net.

(1) NAUTICAL astronomy is simply the application of spherical trigonometry to the problem of ascertaining the latitude and longitude at sea by observations of the heavenly bodies; as also the errors of the compass. To a student acquainted with spherical trigonometry it is only necessary to give the figure showing the data available, and the result required, to enable him to make the necessary calculation. Mr. Symonds gives the figures and also some trigonometrical formulæ, as do all other books, or nearly all others, which treat of navigation and nautical astronomy, but his figures are badly drawn, especially Fig. 2 on p. 8.

It is in the practical application for obtaining the data required for calculating a ship's position that Mr. Symonds fails:—(1) No stress is laid on the importance of obtaining the latitude and longitude simultaneously. This can always be done by star observations at twilight, in the morning and evening, when the horizon is sufficiently clear and the stars are plainly visible. It can often be done in the daytime when either Venus or Jupiter passes the meridian between sunrise and 9 a.m., or between 3 p.m. and sunset. (2) No stress is laid on the refraction of the sea horizon, which can only be eliminated by taking