prevent the general use of Dr. MacDougal's book.

CHARLES E. BESSEY.
THE UNIVERSITY OF NEBRASKA.

De praktische toepassing van Stoomschuif- en Schaarbewegingen bij Stationaire, Locomobiel-, Locomotief- en Scheeps-machines door C. STEUERWALD; Mit eene voorede van H. A. RAVENEK. By W. S. AUCHINCLOSS. Leiden. A. W. Sijthoff. 1899. Pp. 108. Many illustrations.

This book is a translation, into the Dutch, of Auchincloss' well-known treatise on valve-motion, of which a German version has long been in type. The translator is a member of the Faculty of the Polytechnic School of Delft; the introduction is written by Professor Ravenek of the same institution. There is no lack of such works in the English, German and French languages; but the work of Auchincloss excels in the simple and very clear manner in which the graphical constructions are made, "without preceding calculations, simply by outlines on the drawing-board," as Professor Ravenek says in his introduction. The treatise is adjudged 'very suitable to be placed in the hands of apprentices and draughtsmen' as well as of students in mechanical engineering.

The British measures of the original are replaced in the translation by metric.

This reproduction of the American work in Dutch is one of the most gratifying testimonials to the value of the work which has yet appeared. The book is unusually well-printed and its illustrations are exceptionally well-made.

R. H. T.

Mesure des température élevées. Par. H. LE CHATELIER et O. BOUDOUARD. Paris, G. Carré et C. Naud. 1900. Pp. 1–220.

In these few pages Le Chatelier and his assistant have given a terse and useful account of the principal methods of cotemporaneous pyrometry. Measurement of high temperature has, as a rule, referred to the comparison of different temperature functions, and the results obtained have therefore differed enormously. The confusion has gradually subsided however, in proportion as the air thermometry of high temperatures has been more fully mastered. Le Chatelier makes a judicious selection of standard temperatures in the introductory chapters of his book and estimates the probable error to be 1° between 200° and 500°, 5° between 500° and 800°, 10° between 800° and 1100° and upwards 50° above 1100°. In the list of pyrometers which follows I should have referred the calorimetric pyrometer to Pouillet and perhaps included the viscosity pyrometer.

The brief account given of normal temperatures as defined by Kelvin and their relation to the air thermometer is intelligible, well digested and practical in character, though these corrections at high temperatures are of small moment. An account is also given of the standard (hydrogen) air thermometer of the Bureau International at Sèvres, which may be taken as a preliminary model, since the normal air thermometer for high temperatures has not yet been constructed. The authors might have added that very definite steps are being taken in this direction by Holborn and Day at the Reichsanstalt. It has been shown that the platinum-iridium alloy is impervious to nitrogen rigid up to the highest industrial temperatures. Nothing now stands in the way to prevent high temperature measurements from attaining the full precision of low temperature measurements.

The errors usually encountered in high temperature thermometry make up Chapter III. of the book, after which various historical pyrometers are described from figures, and critically discussed. It is interesting to note that the errors of Pouillet were largely due to the high value of the coefficient of expansion then in vogue. Among the whole series the interferential pyrometer of D. Berthelot may be singled out as being peculiarly promising, both on account of the simple and apparently correct principle on which it is based, and on account of its indefinitely high temperature limit of application.

In preference to platinum which is expensive and iron which behaves anomalously, nickel has been recently proposed for calorimetric pyrometry. The authors give a series of appropriate data, and figures of available apparatus, together with the probable inaccuracies of this