

most interesting, the best balanced, the most successful exposition of these subjects which is accessible to that important fraction of the public which has an intellectual interest in the facts and inferences which are doubtless to add much to our knowledge of the structure of matter. A chapter on astro-physics makes a fitting conclusion to an excellent book. There are nearly forty illustrations, together with portraits of Newton, Lord Kelvin, Willard Gibbs, and van't Hoff.

HIGH-TEMPERATURE MEASUREMENTS. BY H. LE CHATELIER AND O. BOUDOUARD. Authorized translation and additions by G. K. BURGESS. Second edition, revised and enlarged. New York: John Wiley and Sons. xiv + 341 pp., 79 figures. Price, \$3.00.

It is but little more than four years since Messrs. Le Chatelier and Boudouard published the first independent handbook devoted exclusively to experimental pyrometry, the "Mesure des Températures élevées," Paris, 1900. Mr. Burgess translated this into English a year later, and now, after but a short interval, he finds it necessary to offer a second English edition containing nearly one-third new material. If we may accept this as a kind of barometric indication of the activity in all branches of research at high temperatures, it represents an altogether unprecedented interest in pyrometry and its applications.

The greatest advances in the interval since the first edition are to be found in the greatly increased accuracy with which the fixed points of the high temperature scale are now known, and in the extraordinary progress in optical pyrometry. The boiling-point of sulphur ( $444.6^\circ$ ) is now established securely within one- or two-tenths of a degree. Dr. Burgess expresses less confidence in the melting-point of gold ( $1065^\circ$ ) and suggests  $5^\circ$  as the limit of uncertainty. All the higher temperatures are still dependent upon extrapolation, but with several available methods and generally concordant results.

In the concluding chapter the suggestion is made to investigators that greater exactness and greater convenience of determination of the temperatures of common reference will be obtained by substituting the melting-points of chemically pure salts for those of the metals. The salts which are available for such a purpose are of such relatively low density and poor conductivity for heat that the phenomena attending change of state at high

temperatures are less sharply marked and less easy to interpret than one would desire in important standards for general use. There is always danger that error or misunderstanding may enter into their determination to such an extent as to outweigh the gain in convenience and in chemical purity. Better determinations of the melting-points of pure salts are certainly greatly needed, but to substitute these for the standard metals would seem to be a somewhat hazardous step.

The book contains an excellent account of the application of the laws of radiation to pyrometric measurement, together with most useful directions for the practical handling of the various forms of apparatus required, their sensitiveness and their limitations.

ARTHUR L. DAY.

**MANUAL OF SERUM DIAGNOSIS.** BY ROSTOSKI, TRANSLATED BY CHARLES BALDUAN, M.D. 12mo. vi + 86 pp. New York : John Wiley and Sons. Price, \$1.00.

There are two forms of pathogenic micro-organisms—one causing disease by producing specific toxines, the other affecting the health of the organism by the direct action of the germ on the surrounding tissue. The micro-organisms of the second group exercise a deleterious effect on the organism also in another manner. Although they do not secrete a toxine, their body substance contains one. This substance is liberated from the micro-organism only after their death and disintegration.

In the course of a bacterial disease the animal body develops protective substances. If the micro-organism causing the disease belongs to the first group, the substance is of the nature of an antitoxine, that means, it aims to neutralize chemically the toxine. In the second group of diseases the substances are lysins and agglutinins, acting as bactericidal substances.

The bactericidal and agglutinating power of the serum of a diseased or immunized animal or individual can be demonstrated also in a test-tube or under the microscope.

This property of the serum has been made use of for diagnostic purposes; the presence of agglutinating, or bactericidal power for a given micro-organism in the serum of an individual generally indicates the present or past infection with the same micro-organism.

This test was found most serviceable in the diagnosis of typhoid