

Unfortunately, there is a tendency to adopt an exaggerated terminology, and to obscure the problems by complicated methods of treatment instead of striving after the simplest possible language. In consequence, the subject is invested with a mysticism which is quite unnecessary.

For this reason a book of the type written by Dr. Arndt is to be welcomed, and the fact that an edition has been exhausted already shows that the work has met a demand.

Following a brief introduction, which, although necessarily condensed, is written in relatively simple style, attention is directed in turn to a number of industries in which the materials handled are colloids. It is the aim of these sections to emphasise the fact that the substances concerned are colloids rather than to explain their behaviour in practice. The list is a very extensive one, ranging from such inorganic materials as glass, tungsten lamp filaments, pottery, and cements to organic industries, including dyeing, tanning, soap-boiling, brewing. Finally, reference is made to the part played by colloids in sewage disposal and in agriculture. The examples are very comprehensive, and serve to show how generally colloids enter into industrial operations.

The discovery by Siedentopf and Zsigmondy of the ultra-microscope, an instrument whereby the single particles in colloid solutions are made visible, has facilitated greatly the investigation of colloidal solutions of metals. In the manufacture of ruby glass, for example, gold chloride is added to the molten glass; when quickly cooled this is colourless, but on subsequent heating up to the point of softening, it suddenly becomes ruby red. The ultramicroscope shows the presence in the coloured glass of colloidal gold particles; in the colourless glass none are to be seen. The explanation is that at first the gold particles are too small to colour the glass; on heating, they increase in size and give rise to the colour.

E. F. A.

#### PRACTICAL PYROMETRY.

*Pyrometry: a Practical Treatise on the Measurement of High Temperatures.* By Chas. R. Darling. Pp. xii+200. (London: E. and F. N. Spon, Ltd.; New York: Spon and Chamberlain, 1911.) Price 5s. net.

WITHIN recent years pyrometry has become an essential factor in a large number of industrial operations where high temperatures are involved; particularly is this the case in the metallurgy of steel, where success or failure often

entirely depends on correct adjustment of the temperature within narrow limits. Mr. Darling's excellent series of Cantor lectures were therefore very welcome, and no less welcome and of wider service will this small volume, the outcome of these lectures, prove.

The "practical man" has a love for the "practical" test in the furnace or kiln, and for many operations, such as those in pottery and china production, an actual firing test is to be commended, but generally manufacturers are devoting more attention to actual temperature measurements. Great advances have been made in recent years in perfecting forms of pyrometers suitable for works practice, amongst which mention may be made of temperature recorders continuous in action, and pyrometers of the radiation type, first introduced by Féry in 1902. The later form of these instruments, with fixed focus, enables excellent measurements of furnace, molten metal, and other high temperatures to be taken by the simple process of directing the pyrometer at the object and reading the deflection on a suitable portable galvanometer.

The author deals in a comprehensive manner with the various types of instruments, and gives valuable advice as to the suitability of those of different classes for special purposes, and emphasises the fact that choice of an unsuitable pattern has often led to considerable monetary loss and the condemnation of an instrument which, in its proper sphere, would have proved satisfactory.

After mentioning that for practical purposes the gas scale is in agreement with the thermodynamical scale of temperature, and serves as a standard of comparison for other instruments of practical form, the author points out that comparison is only possible to the present limit of the gas scale (1550° C.), and that beyond this the results can only be arrived at by extrapolation, which in some cases has led to grave errors. With instruments of the radiation type, however, assumption that the laws applicable for the lower ranges will hold for the higher ones appears to be justified.

Mr. Darling is a clear and concise writer on a scientific subject which has wide commercial application, and his treatment of the subject of practical high temperature measurement in this volume will commend itself to the practical man, who, whilst requiring sufficient of the scientific side to understand the principles involved, does not require abstruse science in his handbooks. This volume, like the author's well known "Heat for Engineers," admirably fulfils these requirements.

J. S. S. B.