narrative is also illustrated with some fourteen diagrams, including a series of Döbereiner lamps and allied devices for ignition with the help of spongy platinum or the like.

The scope of the work has been restricted by excluding the modern developments which have brought surface catalysis to the forefront as an industrial method of first-rate importance, and by omitting the important subject of homogeneous catalysis. The latter is referred to briefly in a "Review of Related and Separated Fields" (Chap. xiv) as well as in the final "Retrospect and Prospect" (Chap. xv). In this final chapter it is pointed out that a lull in the study of heterogeneous catalysis between 1875 and 1890 was followed by an intensive study of homogeneous catalysis; this preceded the great modern applications of surface catalysis, the foundations of which form the subject of the present monograph.

One of the earliest of these foundations was Davy's 'night lamp' (1818); in this lamp a platinum spiral was maintained in incandescence over the wick of a spirit lamp, of which the flame had been blown out. Döbereiner's discovery of the oxidation of alcohol to acetic acid by platinum black followed in 1831; and the ignition of oxyhydrogen mixtures, leading to the development of the Döbereiner lamp, in 1832. The term 'catalysis' was introduced by Berzelius in 1835, and was followed by a controversy with Liebig as to the nature of 'catalytic force'.

The application of catalysis to the preparation of sulphuric acid by the 'contact process' can be traced back to an English patent taken out in 1831 by Phillips, who proposed to use platinum for this purpose, whilst Robb in 1853 introduced the use of 'peroxide of iron'. In the same way, the catalytic oxidation of ammonia to nitric acid can be traced back to the work of Kuhlmann, who discovered in 1838 that nitric acid was formed when air and ammonia were passed over platinum heated to about 300°.

The early period in the history of surface catalysis closes with the technical development of Deacon's process for making chlorine by the catalytic oxidation of hydrogen chloride. This method can be traced back to the work of W. Henry in 1826, but was only developed into a practical process about 1870. The technical conditions in this case were not too difficult, since there was no need for the drastic purification by which alone success was finally achieved in the contact process for sulphuric acid; and the high temperatures and pressures which are required for the synthesis of ammonia, and for many other processes of catalytic hydrogenation, were also not yet needed. There was therefore a natural sequence in the industrial development of surface catalysis, and the authors are to be congratulated on the success with which they have brought out the logical character of this important chapter of chemical history.

Short Reviews

Traité de pyrométrie optique. Par Prof. Gustave Ribaud. (Encyclopédie photométrique, Cinquième section, Mesures sur l'émission, Tome 4.) Pp. xvi + 485. (Paris: Editions de la *Revue d'Optique théorique et instrumentale*, 1931.) 95 francs.

IT is a remarkable sign of the progress of theoretical and experimental knowledge in a single branch of physics that a volume of nearly 500 closely printed pages should be required to give an account of modern optical pyrometry. In an interesting preface, M. Charles Fabry points out that the production of high temperatures in industrial and laboratory operations outstripped for a long period the methods of measuring such temperatures. For example, the gas thermometer, theoretically the simplest form, failed because no reservoir could be found which would retain its shape and remain absolutely impervious to gas at extremely high temperatures. The problem of measuring these temperatures was only effectively solved when the use of a material thermometer was abandoned and attention was concentrated on the radiation emitted by the body the temperature of which was to be found.

All the methods based on the examination of the associated radiation may be included under the name optical pyrometry. These methods are based on the laws of radiation of a black body due to Stefan, Wien, and Planck—laws which are discussed by Prof. Ribaud in the earlier part of the volume. The most valuable method is that of the disappearing filament optical pyrometer. The importance of this instrument is illustrated by its use in determining the temperature of tungsten lamps for an intercomparison of the high temperature scales of the leading standardising laboratories. For any point of the entire range from about 1,400° to 2,700° K. the maximum difference found in such an intercomparison was only a few degrees (W. E. Forsythe). Prof. Ribaud's book should be in the hands of all those who are concerned with high temperature measurements. H. S. A.