increased suddenly about three years ago. Minerals containing magnesium were used by the ancient Greeks and Romans, but it was Black who first distinguished clearly between lime and magnesia in 1755. In 1808 Sir Humphry Davy obtained an amalgam but failed to isolate the metal. Twenty years later, Bussy reduced the fused chloride to the metallic state with the vapour of potassium, but Davy's original electrolytic method was successfully modified in 1852 by Bunsen. In view of the astonishing increase in the industrial applications of the metal in recent years, it is perhaps surprising that this method has not only survived but also has practically eliminated other competitive processes. The chief difficulty to be overcome is the elimination of water from the fused chloride, since even traces of moisture cause hydrolysis and the formation of an insulating layer of oxide. Hydrolysis is considerably lessened when potassium chloride is present, and sometimes carnallite is used. The addition of potassium chloride causes the metal to sink to the bottom in spite of its low density.

Complete dehydration of magnesium chloride is, however, difficult and other industrial processes have been successfully operated. Thus the oxide can be reduced with carbon in the electric furnace and a modification of the Hall-Héroult electrolytic process for aluminium has been adapted for magnesium. Magnesium is the lightest of all metals to withstand atmospheric corrosion, and moreover in the pure state it possesses very valuable mechanical properties. Numerous references are given to technical methods of manufacture and there is a very full description of its physical and chemical properties, including recent work on its atomic structure, isotopes and nuclear transformations under bombardment.

(5) An alphabetical register of all known alloys of magnesium, arranged on the lines of those already published for steels and aluminium alloys, with remarks on their principal uses and references to the patent literature of Germany, Great Britain, France, Austria, Switzerland and the United States from 1909 to the end of 1936, should prove invaluable to those engaged on research work in this technically important and rapidly expanding industry. References to journals are excluded, since they are given in abundance in the text.

Phenomena of Gaseous Discharges

Elektrische Gasentladungslampen
By Dr. W. Uyterhoeven. Unter Mitarbeit von Ing. K. W. Hess. Pp. ix + 364. (Berlin: Julius Springer, 1938.) 36.40 gold marks.

THE scope of this book is wider than its title suggests; this applies especially to the first two parts—the seven chapters dealing with electrons and atoms, and the general theory of discharges in gases.

These seven chapters include, in only 140 pages, practically all the fundamental physical ideas from the kinetic theory of gases to the complete discussion of the positive column. The literature up to about 1937 is considered. In order to cover as much ground as possible in this comparatively small space, the discussion of individual processes has had to be somewhat condensed. However, the non-specialized engineer will find the book provides quite a satisfactory account of the various problems, while the student reader who requires detailed solutions will obtain further information from the numerous papers which are cited at the end of the book and co-ordinated with the individual chapters. In a future edition this part of the book could, perhaps, be extended, especially as attempts have recently been made to revise the theory of the positive column, which is of prime importance in gas discharge phenomena.

Chapters viii and ix deal with light and vision, and contain a survey of colorimetry based on modern concepts, together with a short review of photometry and the efficiency of illuminants.

The later half of the book is devoted to discharge lamps—neon and mercury high-pressure (1–10 atm.) and super-high pressure (80–100 atm.). Some of these chapters will be of permanent value in so far as they discuss the complicated physical *problems* connected with the operation of such discharges and the many practical problems of auxiliary gear. The *solutions* may be looked at from a different angle in a few years time, and in addition development of the special lamp types is very rapid. The majority of the types discussed are Continental and to a great extent are taken from those of the Company in whose laboratory Uyterhoeven has done important work on the development of the discharge lamp. This slight bias is perhaps not unnatural, as the author must have had more information from his own Company than from others.

Uyterhoeven's book can be recommended as an interesting survey of a technical field which may prove absorbing to many engineers. Some of the problems also suggest lines for further research.