

Non-Metallic Inclusions in Iron and Steel. By Dr. Carl Benedicks and Helge Löfquist. Pp. xi + 311 + 44 plates. (London: Chapman and Hall, Ltd., 1930.) 30s. net.

THE useful properties of steel, especially of the higher qualities of steel, depend in large measure on the degree of freedom from non-metallic inclusions. These inclusions, by providing regions of concentration of stress, lower the resistance to fatigue, whilst they also influence the behaviour of the steel towards corrosive agents. Improvements in the manufacture of steel are largely directed towards their elimination, and for the success of such improvements a knowledge of the composition and mode of origin of inclusions is essential. The chemistry of the bath reactions in the steel furnace, by which most of them are formed, is complex, and the authors of this work have had a difficult task in their critical examination of the data. Their presentation is clear and systematic, and for the first time a mass of detailed information concerning inclusions in steel is brought together and discussed in the light of physical chemistry. Metallurgists will not all agree with some of the hypothetical equilibrium diagrams, but these furnish at least a basis for discussion.

The volume is well printed and abundantly illustrated. The micrographic and analytical methods for the identification of inclusions are described, and a general account of ingot structure is included. The practical metallurgist will also find the discussion of the means adopted to lessen the quantity of inclusions, or to disperse them in the least harmful way, an interesting study.

Nutrition and Food Chemistry. By Barnard S. Bronson. Pp. viii + 467. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1930.) 18s. 6d. net.

THE author has attempted a presentation of the scientific principles of nutrition in simple form and suitable for students with little foundation in physiology and none in organic chemistry. The book includes the elements of digestion and metabolism, with details of the composition of many foods. Data are supplied from which it is possible to construct diet sheets and to estimate the suitability of common diets, but for useful dietaries the reader must consult books on dietetics.

The work is based on American practice, and includes descriptions of methods of treating or manufacturing common foodstuffs, as well as of the standards with which various foods must comply: thus, the pasteurisation of milk, the manufacture of ice-cream, and the baking of bread are described, and standards for milk and eggs are given in detail. Although certain portions are not applicable to conditions in Great Britain, the tables of analyses will be extremely useful to all those who wish to know the exact composition of any particular diet: this applies especially to research workers, since unsuspected impurities in a purified diet may markedly affect its nutritive value. For these, the appendices on the vitamin, iron, and copper contents of foods should prove of value.

The work as a whole appears to be rather advanced for elementary students, although the earlier chapters on digestion and metabolism might be read with profit: the later appear more suitable for the specialist.

The Theory of Ruled Surfaces. By W. L. Edge. Pp. ix + 324. (Cambridge: At the University Press, 1931.) 20s. net.

THE general type of ruled surface of the fourth order was mentioned by Chasles in 1861. In 1864 and 1868 these surfaces were studied and classified, though not quite completely, by Cayley, who obtained his different types by means of directing curves and gave algebraic equations for them. The complete classification was first given by Cremona (1868), who used the method of correspondence between two curves. Ruled surfaces of the fifth order were classified by means of their double curves by Schwarz in 1867.

Mr. Edge gives an account of this work and supplements it by his own researches, which include what appears to be the first serious attempt to enumerate the ruled surfaces of the sixth order. He employs two powerful general methods, considering the surfaces as curves in a five-dimensional space, and projecting from space of even higher dimensions. The first chapter contains an account of the principle of correspondence and of other ideas fundamental in modern algebraic geometry. There is no other book easily accessible to English readers where these are explained and applied so extensively. The properties of the ruled surfaces of orders four, five, and six are collected in tables, but there is, unfortunately, no index.

H. T. H. P.

Organic Syntheses: an Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. Editorial Board: Carl S. Marvel, Editor-in-Chief; Roger Adams, W. H. Carothers, H. T. Clarke, J. B. Conant, Henry Gilman, C. R. Noller, F. C. Whitmore, C. F. H. Allen. Vol. 11. Pp. vii + 106. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1931.) 8s. 6d. net.

THIS volume contains particulars of thirty-one preparations. Of the contributors, fourteen are from the United States, two from Germany, and one each from Canada, India, and Austria. Among the interesting preparations are itaconic anhydride and acid (from citric acid), citraconic anhydride and acid (from itaconic anhydride), mesaconic acid (from citraconic anhydride), cyanogen bromide (from sodium cyanide and bromine), ethyl pimelate (from salicylic acid), fumaric acid (in 58 per cent yield from technical furfural), and thiobenzophenone (from benzophenone dichloride and sodium hydrosulphide). The conversion of acrolein into *dl*-glyceric aldehyde in 11 per cent yield is described through the following intermediates: β -chloro-propionaldehyde acetal, acrolein acetal, and *dl*-glyceric aldehyde acetal. The revised collection of preparations contained in the first nine volumes of this valuable series is to appear soon. J. R.