

can be produced artificially from the proximate constituents, hæmatin and globin. Indeed, many compounds of hæmatin and other metallo-porphyrins with various proteins have been produced by R. Hill. Two interesting substances which are discussed in some detail are chlorocruorin, in which the porphyrin group is different, and hæmocyamin, which is a copper-porphyrin compound.

The various hæmoglobins and other porphyrin derivatives which are scattered so widely throughout the animal kingdom possess those properties best suited to the particular biological conditions under which each of them functions.

The book is of great interest, not merely for the large amount of information contained in it, which would not easily be available from any other source, but also by reason of the interesting method by which the author presents the subject and by the incidental anecdotes freely scattered through its pages. These give that personal touch which is so characteristic and attractive a feature of Prof. Barcroft's writings. It is a book which will be read and re-read.

C. L. E.

### Toxic Gases and Vapours.

*Noxious Gases and the Principles of Respiration influencing their Action.* By Yandell Henderson and Howard W. Haggard. (American Chemical Society Monograph Series.) Pp. 220. (New York: The Chemical Catalog Co. Inc., 1927.) 4.50 dollars.

THE authors state that the control of manufacture, handling and sale of substances which are poisonous, other than food and drugs, is inadequately dealt with by the existing Federal and State laws of the United States of America. They have therefore set out in a monograph, which is primarily intended for chemists and engineers, a classification of the noxious gases and volatile substances most frequently met with in industry, with a description of the physiological action of each, so far as it is known, and of the treatment appropriate to counteract its harmful effects on the body.

The first part of the book is devoted to a description of the physiological processes concerned in respiration, to the application of the laws of gases and vapours, and to the principles determining absorption, distribution, and elimination of volatile substances in the human body.

The control of respiration and the respiratory functions of the blood are explained at considerable length, and a reader of this volume will gain a fairly

comprehensive view of modern conceptions on these matters.

Toxic gases and vapours are viewed as problems of respiration, and are therefore classified rather from the point of view of their physiological effects than of their chemical relationship. The authors divide them into four groups, namely: (1) Asphyxiants, (2) irritants, (3) volatile drugs and drug-like substances, (4) inorganic and organo-metallic substances. The asphyxiants are subdivided into: (a) simple asphyxiants which are physiologically inert and act by excluding oxygen from the lungs; and (b) chemical asphyxiants which act either by preventing the blood transporting oxygen or by preventing the tissues from using it.

The irritants are for the most part corrosive agents which injure the tissues of the respiratory tract and thus induce inflammation with a consequent impairment of gaseous exchange in the lungs. Most of the warfare gases fall into this category, but the authors are not concerned with them as such, and they are merely mentioned in their relation to industries.

The volatile drugs and drug-like substances are those which exert some action after absorption through the lungs. They consist of hydrocarbons, many of them anæsthetics, but including also the organic nitro compounds which act upon the blood and circulation, bringing about severe anæmia, and in some cases degeneration of organs such as the liver.

The inorganic and organo-metallic group includes such true poisons as phosphorus, mercury, and lead.

The chief uses in industry and the mode of action on the body and treatment, so far as they are known, are detailed under each group. Reference is also made to recent observations on the relationship between physiological action and chemical constitution, with the deductions which have been drawn therefrom.

The book is written in a very readable style and forms a valuable addition to the literature on the medical aspects of industrial hazards.

As it is intended primarily for engineers and chemists, it perhaps goes into greater detail than is necessary on the mode of action of some of the substances dealt with, for example, in the case of the volatile drugs and drug-like substances.

The authors very rightly emphasise, however, that in accidents from toxic gases in industrial plants, the saving of life is in the hands of the workers present, since in most cases medical aid must inevitably arrive too late.