

in treatment, but the editor has been successful in keeping this to a minimum, and producing a readable continuum. It is invidious to select from such a work, but mention may be made especially of the section upon chemical aspects of growth, in which among other chemical points, a reference is made to the startling experiments which have shown that the life-span of rats may be altered by diet. In a generation when all eyes

are turned towards the attempt to improve rapidity of growth, it is revolutionary to have observations which hint that such speed may not be good for longevity.

The level of writing is high and there is much information presented, so that the book necessarily forms a standard work of reference. The printers must be congratulated upon an excellent standard of production.

## CHEMISTRY OF CHEMICAL WARFARE

### The War Gases

Chemistry and Analysis. By Dr. Mario Sartori. Translated from the second enlarged Italian edition by L. W. Marrison. Pp. xii + 360. (London: J. and A. Churchill, Ltd., 1939.) 21s.

THE first Italian edition of this work was published in 1933, and in 1935 there appeared a German translation by Dr. Klumb which was reviewed in *NATURE* of April 11, 1936, p. 598. A considerable number of books on gas warfare have been written in the last twenty years, but they mostly deal with its military and medical aspects and give comparatively little information about the chemistry of war gases. Dr. Sartori, on the contrary, confines his attention mostly to the chemistry of these substances, but also deals briefly with some of their other properties.

In this second edition, the author has introduced a few pages on the physiopathological properties, and then has dealt in a general way with the physical properties, especially the vapour tension and the related properties: volatility, boiling point and persistence. The volatility is defined as the weight of the substance contained in a cubic metre of saturated vapour at a certain temperature. Consequently, it must be proportional to the product of the vapour tension and the molecular weight. On pp. 6 and 7, however, there are tables of the vapour tension and volatility respectively, and it is evident that the figures are not proportional, even when allowance is made for the differences in molecular weight. At the end of the book there is a more extensive table in which these two properties are given in adjacent columns, and the same discrepancy appears again. Apparently, some of these volatilities were calculated from values for the vapour pressure very different from those given both in the tables and in other parts of the book. It is remarkable that this fairly obvious error has been repeated from the first to the second Italian edition, and has not been noticed by either the German or the English

translator. There is a similar discrepancy in the persistences of dichloroethyl sulphide (mustard gas) and bromobenzyl cyanide (CA) as given in the table on p. 11.

In the last line of the last table on the last page of the text the molecular weight of phenarsazine cyanide,  $\text{NH}(\text{C}_6\text{H}_5)_2\text{AsCN}$ , is given as 272.0, whereas the German edition gave it as 272.9. The correct figure is 268.

Numerous additions have been made in the second edition; the substances dealt with have increased from forty-nine to sixty-four, but the additional fifteen war gases do not appear to be of much practical value and have evidently been introduced to make the work more complete. It is not to be expected that important new developments will be published at present. After the War of 1914-18 much of the accumulated information was released, but the international tension during recent years has led to a return to secrecy. It is also improbable that much advance, if it can be called advance, has been made by the various chemical 'defence' research institutions, as there is no satisfactory method of testing these poisons. They cannot be tried on human beings except in mild doses, and the results with animals may be quite different. The Germans published the results of tests with cats, and more recently the Americans have released some results with dogs and mice. As might be expected, the results do not run parallel.

There is a good deal of additional information in this edition, and there must now be about a thousand references to original papers. The book is evidently the result of years of work and will be found an indispensable guide through the scattered literature of the subject in spite of some inaccuracies in the numerical data. For each substance the available information is given of the properties, laboratory preparation, manufacture and analysis. The translation has been well carried out and the get-up is good, as it is to be expected from the firm of Churchill.

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