

## Reviews.

RECENT ADVANCES IN PHYSICAL AND INORGANIC CHEMISTRY. A. W. STEWART.  
Fifth Edition. Pp. 312. London: Longmans, Green & Co. 1926.  
Price 18s. net.

Although earlier editions of this well known work have been noticed before in the pages of *THE ANALYST*, as this, the fifth edition, has only 5 out of its 21 chapters which have survived with alterations, it is almost a new work. There are a dozen new chapters dealing with subjects of absorbing interest at the present time, such as isotopes, hafnium, active hydrogen, intensive drying, and the new hydrides. Busy technical chemists will be grateful to the author for providing them with a readable (Prof. Stewart's style is very readable) account of all that is new and of fundamental importance in theoretical and inorganic chemistry. The book gives an account of all important advances in sufficient detail to make the development of the subject easily understandable, but is not overburdened with subsidiary matter or too numerous references. It goes a long way towards that co-ordination of new knowledge which is so desirable for a true conception of chemical philosophy; it is so difficult in these days when new discoveries in the sub-atomic field follow one another so quickly, to obtain a comprehensive view and grasp the bearing of one line of work upon another; Stewart distinctly helps us in this way.

When one turns to the detail there is found indisputable accuracy, a stimulating and lucid style and evidence of keen enthusiasm for the subject. Of course, we shall not all agree with some of the views put forward, and we analysts, if we have any tears left, will shed them over the demise of our beloved atoms; we love them and they served us well, yet Stewart says "they are . . . purely mathematical figments." "The case of the determiners of atomic weights . . . is one

of the most pathetic in the whole history of science." Surely not; is it not one of the most praiseworthy, for the care and accuracy bestowed on the work has been the means of revealing new elements, of developing technique, and forms the basis of all accurate quantitative work? Science goes round in circles: a corpuscular theory of light revived recently; transmutation of elements is an accomplished fact; Prout's hypothesis, once abandoned, is now coming into its own in a modified form; who knows whether Dalton's atoms will not one day resume their former glories?

All chemists, and particularly those whose labours lie in other fields than those here dealt with, should read the book and ponder; it makes one wonder what our science will be like in another generation.

H. E. Cox.

VOLUMETRIC IODATE METHODS. By GEORGE S. JAMIESON, Ph.D. Pp. 96.  
New York: The Chemical Catalog Company, Inc. Price \$2.00 net.

This little book is a compilation of methods published from time to time in the form of papers by the author and other investigators. The text-matter deals with the determination of antimony, arsenic, copper, mercury, molybdenum, tin, zinc, hydrazine, hydrogen peroxide, peroxides, thiosulphate, tetrathionate, and sulphite.

The iodate method, based on the reaction  $\text{KIO}_3 + 6\text{HCl} = 3\text{H}_2\text{O} + \text{KCl} + \text{ICl} + 2\text{Cl}_2$ , possesses the features of an accurate volumetric method. The iodate is easily obtained in a state of purity and the standard solution is very stable; the results are stoichiometric, and the end-point is remarkably sharp, being marked by the final decoloration of a small quantity of immiscible solvent such as chloroform; the advantage claimed over the starch indicator is, that there is no return of the iodine colour. The volume should prove a handy laboratory companion to those intending to apply the iodate method to the determination of a variety of constituents.

The value for antimony given in the abridged atomic weight table, dated 1923, is 120.20, whereas the atomic weight was altered to 121.77 in 1925, *i.e.* prior to the publication of the present book. It is unfortunate that it was allowed to make its appearance without a reference to this, the most important change in atomic weights in recent years, and the bearing of the new value on the accuracy of the determination.

In the author's method for zinc, a precipitate of zinc mercuric thiocyanate (filter paper included) is titrated with iodate, after suction filtration and washing with a weak solution of mercuric thiocyanate which, apparently, is not displaced by another liquid prior to titration. The reviewer has no personal experience of this method, but he wonders what advantages, if any, it can have over the improved ferrocyanide process, in which a minute quantity of ferric salt is used as an internal indicator. The same may perhaps be said of the iodate titration of cuprous thiocyanate, as a competitor against Low's iodide method.

The text contains few and unimportant misprints, but all too often the temper of the lover of good English may be ruffled by changes from the passive to the active construction, such as "the method was tested by dissolving weighed quantities of . . ., *taking* precautions"; "another series of experiments was made, *using* weighed portion" (*cf.* ANALYST, 1925, 50, 47).

W. R. SCHOELLER.

APPLIED CHEMISTRY. By C. K. TINKLER, D.Sc., F.I.C., and HELEN MASTERS, B.Sc. Vol. II. (Foods). Pp. 276. London: Crosby, Lockwood & Son. Price 15s.

This volume, like its forerunner, Volume I., is written for students of household science and public health. It is described in the preface as dealing with "certain branches of the chemistry of food and with the interpretation of the analytical results obtained," but its scope is not so limited as this description might suggest, as is shown by the following list of contents:—Milk, 30 pages; Edible Oils and Fats, 33 pages; Carbohydrate Foods, 62 pages; Raising Agents, 27 pages; Meat, Meat Extracts, etc., 18 pages; Vinegar, Fruit Juices and Vegetable Acids, 17 pages; Beverages, 13 pages; Preservation of Food, Condiments, etc., 36 pages; The Calorific Value of Foods, 13 pages.

There can be no doubt that the book adequately fulfils its purpose, for it is obvious throughout that the authors have desired not only to present the necessary information, but also to ensure a thorough understanding of the chemical principles involved. This latter is such a feature of the book that, although it is written expressly for a special university course, it might well be read with profit by students who need a fuller knowledge of the chemistry of food. Excellent examples of the educational value of the book are the explanation of the iodine value of an oil or fat, pages 41 to 44; Chapter IV., on Raising Agents; Chapter VI., on Vinegar, etc.

The analytical methods given are those usually employed in routine analysis, and are well described. The necessary calculations are particularly carefully explained, though the extreme attention to detail in some of these suggests rather poor arithmetical ability on the part of the students. It is essential that methods given should be correct and complete in the important details, and also that standard methods, given as such, should not be subjected to alteration. There are a few exceptions in these respects, such as are included in the remarks below:

Page 6: Rose-Gottlieb Method. In this, after the addition of the ether, the student is instructed to mix the contents of the tube by inverting it three times, and told that if the mixture is shaken too vigorously an emulsion may be formed which separates very slowly. Actually, thorough mixing is a very important part of the process, and it is wise to specify vigorous shaking for one minute in order to ensure satisfactory results.

Pages 56 and 57. The method given for the Reichert-Meissl and Polenske values differs in some respects from that generally practised; moreover, no "blank" on the reagents is specified.

Page 180. The statement that the  $P_H$  value for distilled water = 7 requires amplification, as it is true only of distilled water specially prepared and stored.

On page 107 golden syrup is described as the mother liquor from which white granulated sugar has been separated. Golden syrup is not a by-product of this nature, but a substance of deliberate manufacture.

Page 217. With reference to the Marsh-Berzelius Test. "As little as 0.01 mgrm. of arsenious oxide giving a very distinct mirror." A well conducted test should show distinctly the presence of one-tenth of this amount of arsenic. As is usual, glucose is the standard example mentioned in connection with the arsenic test. Although it is true that glucose will often be found to contain arsenic, it would be only fair to mention that this product is manufactured with great care, and that the amount of arsenic present is generally well below 0.5 part per million.

Cocoa and Chocolate (pages 194 to 196) receive meagre treatment, and no analytical work is described.

A description of a method of determining the amount of stalk in tea might have been included as being of use to students of household science; also, a method for estimation of chicory in coffee mixtures might have been given.

The book is well printed and free from typographical errors, except for a very few in spelling which are of no real significance.

The volume bears evidence throughout of careful and considered compilation, and is of real educational value.

E. B. HUGHES.

INK MANUFACTURE. By S. LEHNER. Third Revised and Enlarged English Edition. Pp. 212+viii. London: Scott, Greenwood & Son. 1926. Price 7s. 6d. net.

The present is the third English edition which has been revised and compared with the seventh German edition by Mr. C. Ainsworth Mitchell. The book therefore has sold well, and it is manifest that a work on the subject of Ink Manufacture is needed. The reviewer is inclined to think, however, that the continued sale may not be due entirely to the value of the book, but to a hope on the part of ink manufacturers and others that what they see advertised may prove to be what they require, and possibly the buyers may be as disappointed as the reviewer.

The book is apparently intended as a practical guide to the ink manufacturer, but, despite its many editions, it has not yet grown out of the stage of the household book of recipes, and often contains just sufficient information to be misleading.

The two most serious faults are: First, a lack of uniformity in nomenclature; and, second, the insufficiency and vagueness of many of the formulae and directions

given. Thus among the names applied to various ingredients are the following:—Acetic acid, vinegar and pyroligneous acid; alcohol, spirit and strong spirit; ammonia and dilute caustic ammonia; copperas, green vitriol and ferrous sulphate; copper sulphate and cupric sulphate. The vagueness referred to is exemplified by the recommendation to use hydrochloric acid, nitric acid and sulphuric acid, respectively, with frequently no indication of the strength required; also by the use of the terms alum, tartar, wax, fat, soap, and tin salt without any definition of what is meant. Again, the use of strong sulphuric acid may be most dangerous unless special precautions are taken to avoid accident, and the necessity for care is not mentioned; also the use of potassium or sodium silicate solution for preparing a safety ink might be disastrous if the commercial solution, which generally contains a large excess of strong alkali, were employed.

The directions for preparing such chemical reagents as ammonium sulphide, ferric sulphate, ferrous sulphate, lead iodide, potassium chromate, Prussian blue, and silver nitrate, are unnecessary, since all these substances may be purchased in any degree of purity required far better and cheaper than they can be made by the ink manufacturer, even though he may need them for experimental purposes, for which the small-scale preparation is specially recommended.

The restoration of faded writing is well described, but is altogether out of place in a book addressed to ink manufacturers, and such work, which is of a very delicate nature, can only be successfully undertaken by those who have made a special study of the subject and who have acquired the necessary experience.

The book would read better if the several lapses from the impersonal to the use of the third person plural (we) were avoided.

From what has been said it is evident that the book could be much improved, and it is hoped that this may be done in any future edition. As it is, however, it will be useful, and will more than repay its cost if it contains one new fact that will help or inspire the ink manufacturer towards the improvement of his ink or the cheapening of its production.

The author, of course, and not the translator, is responsible for the imperfections pointed out.

The size of the book, the type, the printing and the binding are all excellent.

A. LUCAS.

**WATER STERILISATION BY GASEOUS CHLORINE.** By the Paterson Engineering Co., Ltd., Kingsway, W.C. Pp. 70.

While frankly an advertisement, this is nevertheless a useful and informative little book, and very fairly makes out its case.

Of all the methods intended for the sterilisation of waters in use at the present time, the most efficient and, on a large scale, the cheapest, are based on the use of chlorine or chlorine compounds.

Subject to slight reservations, the technique of the process is fairly well understood, and accumulated experience has produced ingenious, reliable and compact apparatus for distributing and automatically regulating the quantity of the reagent required, though not to the extent of automatic adjustment to variations in the quality of the water supply.

Theoretically the addition to drinking water of such more or less noxious compounds is objectionable, but the minute proportions employed are probably quite harmless, and when the process has been properly carried out the reacting substance practically disappears.

As compared with bleaching powder and hypochlorites, gaseous chlorine has some very marked advantages. It is practically pure (*i.e.* 100 per cent.), is stable and contributes no solid matter to the treated water. As compared with caustic lime treatment, the economy of space and time is obvious.

The main objection to the use of chlorine, and this of course applies to the compounds of chlorine, is its liability to produce an unpleasant taste, due either to an actual excess of the reagent or to the action of the chlorine on the organic substances in the water. In the majority of cases more accurate control is the remedy.

The special claims on behalf of the Paterson installation are very clearly described and illustrated in the text. This specially designed and patented apparatus of British manufacture provides an automatic delivery of chlorine, the dosage being regulated by two different types of apparatus:—(1) The Pulser Chloronome, in which the gas is actually measured, intended for smaller plants up to one or two million gallons per day, and (2) the manometer type, for the largest installations, in which the gas is regulated, under constant pressure through an appropriate aperture, a scale on the manometer on the distal side of the diaphragm being read in pounds of chlorine per hour.

To avoid the corrosion of the metal parts of this apparatus the gas up to this stage must be dry, and, to ensure this, a "moisture seal" in the form of a layer of an inert liquid interposes a barrier between the control apparatus and the water to be treated. Having passed this, the gas is led into a glazed earthenware absorption tower in which a highly concentrated solution of chlorine is produced, which in turn is led into distributors to bring about uniform admixture with the main bulk of the water to be treated.

The details are very fully illustrated and described, including the chemical methods for controlling the strength of the chlorinated water.

CECIL H. CRIBB,