

NEW BOOKS ON CHEMISTRY.

- (1) *Preliminary Chemistry*. By H. W. Bausor. Pp. 106. (London: W. B. Clive, 1913.) Price 1s. 6d.
- (2) *Manual of Qualitative Analysis. Reagent and Combustion Methods*. By W. F. Hoyt. Pp. vi+35. (New York: The Macmillan Co.; London: Macmillan & Co., Ltd., 1913.) Price 1s. 3d. net.)
- (3) *A Course in General Chemistry*. By Prof. W. McPherson and Prof. W. E. Henderson. Pp. viii+556. (Boston and London: Ginn & Co., n.d.) Price 10s. 6d.
- (4) *Treatise on General and Industrial Organic Chemistry*. By Dr. Ettore Molinari. Translated from the second enlarged and revised Italian edition by T. H. Pope. Pp. xix+770. (London: J. & A. Churchill, 1913.) Price 24s. net.
- (5) *Qualitative Analyse vom Standpunkte der Ionenlehre*. By Dr. W. Böttger. Dritte Auflage. Pp. xvii+565. (Leipzig: W. Engelmann, 1913.) Price 11.20 marks.
- (6) *Chemie. Unter Redaktion von E. v. Meyer. Allgemeine Kristallographie und Mineralogie. Unter Redaktion von Fr. Rinne. Bearbeitet von E. v. Meyer, G. Engler, und L. Wohler, O. Wallach, and others*. Pp. xiv+663. (Leipzig und Berlin: B. G. Teubner, 1913.) Price 21 marks.

(1) **T**HE "Preliminary Chemistry" by Mr. Bausor, which is issued by the University Tutorial Press, provides, as the preface states, a course of simple experiments for beginners in chemistry, from which most elementary principles of the science are deduced. There are six chapters dealing with air, water, carbon dioxide and lime, salt and hydrochloric acid, sulphur and its acids, and, finally, carbon and combustion. Each chapter is furnished with a summary, a set of questions, and some practical exercises. The experiments are simple in character so as to be well within the capacity of a schoolboy, and the sequence is so arranged as to illustrate fundamental ideas in a clear and logical fashion. For the most part they run on familiar lines. It may be pointed out that the definition of one term by using another, which is left undefined, does not leave the matter much clearer. "If by its conversion into ice or into vapour a new body had been produced differing in *constitution* from the water, we should no longer have been dealing with a physical change." No doubt the orthodox way of beginning a book on practical chemistry is to direct attention to the fundamental distinction between chemical and physical changes; but is it really essential to start with it? Could not the

question be more easily answered after a certain number of chemical changes had been observed?

(2) Mr. Hoyt's manual of qualitative analysis is a small volume of 36 pages. Though small and cheap, it is crammed with facts, so crowded, indeed, that the author has recourse to a kind of shorthand in addition to the ordinary chemical formulæ in order to compress his materials. To take one example, the confirmatory test for iron by the action of potassium hydroxide is expressed thus: conf. $2 = \text{sol} + \text{KOH} = \text{precip. white to dirty green (if Fe}^{II}\text{) or brown (if Fe}^{III}\text{)}$.

There are few or no explanations, and the whole compilation is that of a mere mechanical guide-book interspersed with a few moral and practical precepts. No one can grumble with the statement that "most laboratory accidents are avoidable" or the advice to be "cleanly in person and work"; but what precise meaning is conveyed by "Nature thinks in the molecule only, and you should learn to do the same" it is difficult to say. The student is further enjoined to "ask himself constantly what? how? and why?" We can only trust that he will have something more substantial than the manual for supplying the answers.

(3) The course on general chemistry by McPherson and Henderson forms an excellent introduction to a more elaborate study, or, in terms of the usual examination standards, would be a useful text-book for a student at the intermediate stage of his chemistry course.

Although the subjects are treated in an elementary fashion, no facts or theories of real importance are omitted, whilst at the same time the text is not overloaded with the description of an unnecessary number of compounds.

The book is written in a clear and simple style, the illustrations, though not so abundant as are sometimes found in American chemical books for elementary students, are well and neatly drawn, so that all the essential details are apparent, an effect partly due to the excellence of the paper. It has evidently been compiled by thoughtful and experienced teachers, who have spared no trouble in the treatment of their subject. It is, in short, a book that may be safely recommended as a text-book for a first year college course.

(4) Molinari's organic chemistry is mainly descriptive of the organic industries, that is to say, theoretical considerations are largely subordinated to the industrial applications of this branch of the science. For example, *tautomerism* occupies half a page, and *stereoisomerism* five pages, whereas the manufacture of explosives and the sugar industry cover about 40 pages each, the brewing of beer and the gas manufacture extend to more

than 20 pages each, and many other technical processes, such as the manufacture of soap, starch, and paper, are treated in the same detailed fashion. We have no desire to underrate the value of a book which devotes the greater part of its space to technology. On the contrary, the excellent and copious illustrations of plant and machinery, the clear exposition of the processes and the carefully compiled statistics will appeal to many students of organic chemistry, who will look in vain for practical information of this character in the ordinary text-book.

But they must bear in mind that the description of operations, which are often merely mechanical and in no sense chemical, cannot replace the principles of the science, which should be carefully studied and assimilated in advance.

Whilst, therefore, strongly recommending the book to the English student, we must warn him that he cannot afford to neglect the theoretical side, and that details of any technical process, however elaborate, will not make him a technologist. We must also point out that he is placed at some disadvantage by reason of the book having been written by an Italian for Italians. The apparatus and methods of technical analysis are often not those recognised as standard methods in this country. Moreover, the rather indiscriminate mixing of English and foreign weights and measures is a little confusing.

Thus, we are told on page 69 that in desulphurising petroleum 4500 kilos of iron oxide are mixed with 200 tons of petroleum; on page 72 it is stated that the value of Bakoum petroleum is about 7s. 2d. per quintal; on page 532 the quantity of tar treated in England is given in tons; whilst that of creosote oil extracted from it is put down in hectolitres. Moreover, the ton is the metric ton (1000 kilos) and not the English weight. If, in a future edition, the technology could be edited by the translator and English money, weights, and measures introduced so as to conform with English practice, the utility and interest of the volume for English readers would be greatly enhanced. As it is, the volume is a distinct addition to chemical literature, and the translator, Mr. T. H. Pope, may be congratulated on the ability with which he has carried out a task which must have entailed an enormous amount of assiduous application.

(5) Dr. Böttger's qualitative analysis based on the ionic theory is too well known to need a special notice. The present volume is the third edition. The principal changes are corrections and emendation of the text and the addition of microchemical reactions, which have been specially studied for the new edition by his collaborators, R. Heinze

and R. Griessbach. The chapters on oxidation and reduction have been thoroughly revised, and a section on autoxidation has been added.

Qualitative analysis is a branch of practical chemistry which is so frequently presented in the form of small books adapted for examination use, that it is a satisfaction occasionally to meet with one in which the subject is raised to something like its proper dignity; and no justification for such a book is needed. It is interesting, nevertheless, to read Dr. Böttger's apologia; for it expresses views in which many teachers of chemistry will entirely concur. The following is a rough translation:—"The preference for short and elementary text-books, whereby a working mastery of analytical technique can be achieved, stands in direct opposition to the views attached to other branches of study in institutions for higher education and to the system of instruction current in the higher secondary schools. It is obvious that so large a mass of material as that included in analytical chemistry cannot be mastered in the short time devoted to the study of qualitative analysis. But it is unquestionably more important and educative for the beginner to learn to use at the outset a book which may act as a guide in his later researches, even if it involves a little more labour, than to study analysis from elementary books which must fail him when more difficult problems present themselves."

(6) The volume under review is on chemistry and crystallography, and is one of nineteen, which include mathematics, the natural sciences, and medicine. They form together one section of a series, which, when completed, will comprise upwards of sixty volumes dealing with what is termed "Modern Culture."

The present volume contains an account of the development of different branches of chemical science, such as inorganic, organic, and physical chemistry, thermochemistry, photochemistry, electrochemistry, physiological chemistry, agricultural chemistry, and crystallography, all within the space of 650 pages.

The names of the contributors are sufficiently well known in the chemical world to ensure that each subject is adequately treated so far as space permits. E. von Meyer has written a general, historical introduction, and among other writers are Wallach, Luther, Nernst, Le Blanc, Kossel, Witt, &c. Each subject is introduced by a brief historical review, with an account of its later progress and development. The book is, in short, a history of the science brought down to modern times.

It is not quite easy to determine for what class of readers the book is intended. It is far beyond

the grasp of the scientific tyro, and a well-informed chemist would probably find little that was new to him. Nevertheless it is not without a certain fascination, if only by the mere perusal of a record which exhibits in a striking manner the wonderful fertility of the science and its extraordinary growth in recent years. Moreover, it is well written, well printed on good paper, and handsomely bound.

Anyone who succeeds in assimilating a fraction of the contents of the other fifty-nine volumes, in addition to this, may indeed claim to have reached a condition of modern culture of unexampled thoroughness.

J. B. C.

GAS, LIGHT AND AIR.

(1) *Gas Testing and Air Measurement*. By C. Chandley. Pp. vii + 77. (London: Methuen and Co., Ltd., n.d.) Price 1s. 6d.

(2) *Light, Radiation, and Illumination*. Translated from the German of Paul Högnér by Justus Eck. Pp. xii + 88. (London: The Electrician Printing and Publishing Co., Ltd., n.d.) Price 6s. net.

(1) THE title of the first of these books is somewhat misleading. In these days of high-pressure gas and the use of burners in which the adjustment of the induced air is of the first importance, it is very natural to suppose that a work entitled "Gas Testing and Air Measurement" has something to do with gas burners. This is not the case. By gas is meant fire-damp in mines, and the air measurement refers to the ordinary practice in mines of measuring the ventilating currents.

The author deals with the indications of the safety lamp as an indicator of the proportion of fire-damp if this is not outside the limits of 2 and 5 or 6 per cent., and of the effect of quantities above the explosive limit in putting out the flame. He does not refer to any of the devices that have been used for showing smaller quantities, as, for instance, Prof. Clowes's hydrogen lamp or Liveing's fire-damp indicator. The book is intended primarily for candidates for certificates under section 15 of the Coal Mines Act, 1911. It should serve this purpose well, as the discussion of the all-important cap of the flame of the safety lamp is very clear; some attention is given to the legal requirements and official regulations relating to coal mines, and the methods used for measuring ventilating currents are very fully explained.

(2) "Light, Radiation, and Illumination" is an admirable exposition of the science which forms the basis of the practice of the illuminating engineer. It is the object of the members of this recently organised profession to apply light so as to obtain economical and satisfactory illumination,

and not merely to place so many hundred candle-power of illuminating means in a room or a street. The scheme of the book is not unlike that of Euclid, but using the methods of trigonometry and the calculus and geometrical illustrations of a series of propositions following in logical sequence the demonstrations are as clear as any in Euclid, but the time and space required are vastly less than that which would be necessary with a purely geometrical method.

Beginning with a flat element of surface of a given luminous intensity, the author shows that the light radiated in different directions in space is proportional to the chords of a sphere to which the flat surface is tangent at the element. Then gradually sources of other geometrical forms are considered, and such real sources of light as filaments and arc light carbons. The illumination of surfaces and spaces, the effect of light-coloured walls, the curves of illumination from different sources, the uniformity of illumination with many lamps, and many other branches of the subject are treated fully and convincingly, and numerous tables for facilitating calculations in real cases are found as they are required.

While the forms of the illumination curves given by incandescent electric lamps and three kinds of arc lamps receive their full share of attention, no reference whatever is made to gas lighting. Now that the most beautifully lighted streets in London—Victoria Street, Pall Mall, and other streets in the West End, covering some miles—are lighted by high-pressure incandescent gas, it seems rather an omission not to have any statement even of the nature of the illumination curve of this type of burner. While the publishers may persuade themselves that electric illumination now is, after daylight, the only kind that matters, this is not the fact, and the author might with advantage have given the illumination curve of one type of high-pressure gas burner. In spite, however, of this omission, the book is a splendid example of science applied to an art which has been too long neglected.

OUR BOOKSHELF.

The Place of Climatology in Medicine: being the Samuel Hyde Memorial Lectures, 1913. By Dr. W. Gordon. Pp. v + 62. (London: H. K. Lewis, 1913.) Price 3s. 6d. net.

At a time when the broad features of the climate of civilised countries are well established through long series of exact observations, it is well to be reminded that an accurate knowledge of the local variations, especially of wind and rainfall, are of vital importance in medical climatology. We have yet to produce properly contoured large-scale maps of climate, even for well-populated districts.