

anneal so as to withstand the strain of laboratory use nothing was known at all.

The researches which are now republished relate mainly to the practical class of problems. The seven papers on the testing of laboratory glassware contain information which has been of the greatest value to glass manufacturers. They should also be very carefully studied by everyone engaged in analytical work. The attention of chemists and physicists is also directed to some interesting papers relating to the calibration of volumetric apparatus and to blowpipe work.

Experimental work in connection with refractory materials, furnace problems, etc., is also being undertaken, but only preliminary notes on the results are as yet available.

The publication contains an account of the educational activities of the department, which includes a school of instruction in blowpipe work.

M. W. T.

#### PHYSICAL CHEMISTRY.

(1) *Text-book of Physical Chemistry*. By Prof. A. T. Lincoln. Pp. viii+547. (London: G. G. Harrap and Co., Ltd., 1918.) Price 12s. 6d. net.

(2) *Outlines of Theoretical Chemistry*. By Dr. F. H. Getman. Second edition, thoroughly revised and enlarged. Pp. xvi+539. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1918.) Price 16s. 6d. net.

IN the matter of text-books, physical chemistry seems to be coming into its own. It is a healthy sign. Not, indeed, that mere numbers of text-books are any trustworthy measure of the growth and vigour of a science, nor is the unrestricted compilation of them to be encouraged, but physical chemistry is a relatively youthful science, and there is still ample room for individual exposition of the subject.

We have before us two general text-books of physical chemistry of moderate size and scope, and it may be said at once that both can be recommended to students who are commencing the subject. In books of this kind the great difficulty for the writer is to know what to exclude, for, of course, much has to be excluded, and no very detailed discussion of any problem is possible. The two books, although of much the same "standard," naturally exhibit their individuality in this respect. There is one point which should not be overlooked: both books are by American authors. It is evident that physical chemistry is taken much more seriously in America than it is in our own country. The fact is that the Americans, like the Germans before them, have realised the fundamental importance of physico-chemical thinking, not only for advance on the theoretical side, but equally so for technical and industrial progress.

(1) Prof. Lincoln's book is well written, and the fundamental principles are clearly developed and explained. Considerable attention is paid to the laboratory side of the subject. There are a few

historical references, which give added interest to the text. Without going into detail, it may be said that optical properties are particularly well treated, as is also the general problem of heterogeneous equilibrium—e.g. the phase rule and its manifold applications, the principles of fractional distillation, and the solubility relations of three components. (In the last connection a particularly good account is given of the use of the triangular diagram.) There is likewise a fairly comprehensive discussion of colloids, of non-aqueous solutions, and of the ionising power of a solvent. Except in a few sections, only the most elementary mathematics is employed. This makes the book very suitable for those beginning the subject, but, of course, limits its scope. There are a few misprints—e.g. Frick for Fick on p. 434—and a rather remarkable statement on p. 378 in connection with hydration, which is not quite what the author intends. The absence of a name index is perhaps a drawback, and the use of the term *heat-tone* as a translation of *Wärmetönung* is to be deprecated.

(2) Dr. Getman's book, which now reaches its second edition, is an excellent exposition of physical chemistry for those commencing the subject. Again only elementary mathematics is used, and, although numerous thermodynamical results are quoted and applied, the author has not attempted any systematic treatment of the principles of thermodynamics which would have taken him beyond the general aim and scope of the book. It may be mentioned that the subject of conduction of electricity through gases is given much more prominence than is usual in a book of this kind. The same thing is true of the subjects radio-activity, atomic structure, polarisation, and photochemistry. The results of modern research have been incorporated in a skilful manner, and the student is frequently referred to original sources for further information. The presentation of the whole subject is consequently very much up to date. Each chapter is furnished with a set of problems which will be of good service in enabling the student to grasp thoroughly the meaning of what he reads.

W. C. McC. LEWIS.

#### OUR BOOKSHELF.

*Text-book on Practical Astronomy*. By Prof. George L. Hosmer. Second edition, revised. Pp. ix+205. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1917.) Price 9s. 6d. net.

The professed object of the author was to satisfy the requirements of civil engineering students, who are unlikely to take up a more advanced study of astronomy, and to produce a text-book intermediate between those formally devoted to astronomy and geodesy, and the short chapter on astronomy generally to be met with in works on surveying. By the lucidity of the explanations and the simplicity of the general treatment of the subject, the book seems well adapted to