advantage, especially those dealing with the estimation of halogen and of sulphur, but merely in order that space might be found for a description of the analysis of organic salts, &c., and of the methods used in the determination of vapour density and molecular weight; such an alteration would make this general part even more useful as an introduction to research-work.

In Part ii. the author gives instructions for the preparation of a large number of compounds, the examples being carefully chosen in order to illustrate practically all the more important reactions, including those only recently discovered. After each preparation there follows a brief account of the theory of the reaction which has been studied, other practical methods by which similar results may be attained are pointed out, and, with the aid of numerous examples, the general application of the reaction is considered; the properties of the preparation, and of the class of substances to which it belongs, are also described, the more important reactions being illustrated by test-tube experiments which the student is directed to perform. The classification of the preparations into "alipathic" and "aromatic," which is here adopted, and the treatment of the former before the latter, are no doubt necessary from an author's point of view; but if this course is strictly adhered to in practice, it has the disadvantage that the student undertakes some of the more difficult preparations before he has had any experience. Prof. Gattermann does not indicate whether the preparations are intended to be carried out in the given order; but as each is practically complete in itself, there is no reason why a little discretion should not be exercised, the easier ones being taken first.

This part of the book is an elegant combination of practice and theory, and cannot fail to arouse and maintain interest in both; it will doubtless have the result which the author desires, namely, "that the student already, during the period given to aboratory work, becomes familiar with the most varied theoretical knowledge possible, which, acquired under these conditions, adheres more firmly, as is well known, than if that knowledge were obtained exclusively from a purely theoretical book."[1]

In Part iii., which consists of a few pages only, the author gives details of the preparation of some inorganic compounds (the halogen acids, phosphorus chlorides, &c.) which are very frequently used in organic work.

It would be hard, indeed, to express anything but a very favourable opinion of Prof. Gattermann's excellent book as an introduction to practical organic chemistry; a student who reads it carefully will save himself labour, time, and material, and will avoid many of the usual mistakes and accidents; at the same time, he will gain a sound practical knowledge which will help him to commence research with a good prospect of success.

Dr. Shober's translation is very readable, although it bears traces of the impress "Made in Germany": the nomenclature might, perhaps, have been brought more in accordance with that adopted by the Chemical Society, but inasmuch as almost every chemist has his own system, it is impossible to please all.

Since the advance of organic chemistry in this country must, in some measure, depend on the nature of the available text-books, both the author and translator deserve our thanks for providing us with a work such as the present one. F. S. K.

[1] Author's preface.

OUR BOOK SHELF.

The Detection and Measurement of Inflammable Gas and Vapour in the Air. By F. Clowes, D.Sc., and Boverton Redwood, F.R.S.E. Pp. xii + 206. (London: Crosby Lockwood and Son, 1896.)

THIS book describes the evolution of the "hydrogen-lamp" for the detection and estimation of fire-damp in coal-mines, as well as for the detection of other gases and vapours which may form explosive mixtures with air. In an historical introduction, and in various appendices, Prof. Clowes gives an account of the various appliances which have been brought forward for the detection of small quantities of fire-damp, and each method in turn is criticised and condemned in view of the "superior advantages" of the hydrogen-lamp. How far it is desirable for the inventor of a particular process to write a book on the general subject of gas-testing, and to criticise rival inventions in it, need not be discussed; the literary character of the book certainly suffers, as witness the following:—"The advantages of the hydrogen-flame render it so distinctly superior to every other testing-flame, that those who have once become familiar with its use prefer it to all other flames in delicate and accurate testing." This is not taken from a page of advertisements, but is the last paragraph of the "historical summary."

Apart from this one fault we have no criticism to make. Prof. Clowes has put together in a convenient form a number of bits of information useful to mining engineers, and has given full details of his own experiments on a difficult and important subject. The success of the hydrogen-lamp has passed beyond the experimental stage. It is a practical instrument, which we feel confident will lead to increased safety in mining industry. Prof. Clowes shows how the lamp can be used for detecting other inflammable gases, as well as for showing the presence of carbonic acid in the air; and Mr. Boverton Redwood contributes a chapter on its use in detecting inflammable vapour from petroleum. The construction of petroleum-tank steamships has made an accurate test for petroleum vapour necessary, and the hydrogen-lamp of Prof. Clowes has been successfully adapted for this purpose. The book is capitally illustrated.

Mensuration. By Alfred Lodge, M.A. Pp. 274. (London: Longmans, Green, and Co., 1895.)

IN this book the student is assumed to have an elementary knowledge of mensuration, and to know, also, something of elementary trigonometry as far as the solution of triangles; in fact, it is intended chiefly for senior students. In its arrangement, volumes, surfaces, and solids are first dealt with; then follow chapters on spherical lunes, triangles, polygons, regular polyhedra, and plane figures. An interesting chapter is given on the mensuration of such earthworks as would be required in excavating cuttings for roads or railways, and in the construction of embankments. Chapter viii. is confined chiefly to the use of logarithms in solving triangles, while the following one is devoted to the relationship between British and metric measures. A short survey shows that the book should prove serviceable to those readers who wish to acquire a sound knowledge of the theoretical side of this subject. It may be mentioned that in the determination of volumes of solids the formulæ are, for the most part, all based on Simpson's rule. A great number of both numerical and algebraical examples are scattered throughout, and very neat and instructive figures are inserted in the text.