CHEMISTRY FROM HARVARD.

Elementary Studies in Chemistry. By Joseph Torrey junr., Instructor in Harvard University. Pp. viii+487. (Westminster: Archibald Constable and Co., Ltd. 1900.)

THIS book is written with an evident desire to present elementary chemistry in such a way as to give full effect to its educational capabilities without neglecting other ends and without a sacrifice of those external features of interest which in the past have covered such a multitude of sins. Mr. Torrey has, in fact, had but one aim, and that to make the best of his subject. A spirit of entire forgetfulness of examiners and syllabuses pervades the work, and things and theories are dealt with according to their intrinsic importance. To say so much is to say a great deal in favour of the book, and to this it must yet be added that the author writes like a practised and enlightened teacher. English teachers of chemistry, both in secondary schools and colleges, will do well to look at Mr. Torrey's book, if only to see the sort of thing that is put forward from Harvard as a suitable course of elementary chemistry. It must be remarked, however, that the course is not intended for quite the same class of pupil that in this country has in recent years been supplied with reformed courses of elementary science. Mr. Torrey's course seems intended for the later stages of the secondary school or for beginners in a college.

To point out the essential difference of plan between teaching chemistry in a stimulating way and teaching it in a deadening way would be to repeat what has often been said before in these columns. It is becoming the habit to summarise these two plans in the words *heuristic* and *didactic*, and these philosophical terms have acquired something of the character of verbal missiles, to be hurled by contending parties as weapons of offence.

Two main contentions are heard against the feasibility of improved methods of science teaching. The first is to the effect that a certain proportion of youth have a natural repugnance to science, even in its most inviting form. They refuse to be interested, they will not find out; therefore they must be told things and made to listen and repeat. It seems very doubtful whether this allegation does not very frequently arise from an injudicious or a too impatient teacher, or from one who has the misfortune to deal with good material already spoiled by bad treatment. Where it is wholly true the reply would be, let such pupils be tried with some other subject. If the same resistance continues to be shown, we surely are dealing with something akin to the deficient or feeble-minded class for which at last some separate treatment must be provided. It seems an unfortunate conclusion to reach, that because a good method does not appeal to all, it should be alloyed with an inferior one for the sake of a few.

The second contention is that a good course of science teaching presents difficulties from the examinational standpoint. This is, unfortunately, only too true. It is, undoubtedly, a great practical obstacle, and its removal can only be looked for when further abatement has taken place in the rigour of the whole examinational system,

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which holds so many good teachers of all subjects in its paralysing grasp.

It is difficult to give in narrow limits an indication of the sequence and style of Mr. Torrey's course. The book is written in the form of short lectures of a suggestive kind, followed by indications of the laboratory work to be done in connection with, or consequent upon, the lectures. It begins with physical topics, including certain measurements, thermometry, vapour pressure and density of gases. The chemistry begins with hydrogen and the composition of water, which is to be studied quantitatively; the composition of hydrogen chloride is then dealt with, in order to accumulate enough material for a discussion of Avogadro's theory. Then follow oxidation, symbols and formulae, determination of atomic weights, acids, bases and salts, electrolysis and electrolytic dissociation, sodium as a metallic element and its chief compounds, the sodium group of metals, the atmosphere, ammonia, nitric acid, the nitrogen family, the sulphur family, the calcium group, &c., ending with carbon and its inorganic compounds. In an appendix we find hints on the manipulation of glass, a list of apparatus required, a list of books for a teacher's library, a few numerical tables and two pages of logarithms.

It would not be difficult to find fault with the order of topics, and the chief objection would perhaps be to the early introduction of the theory of atoms and molecules and other theoretical matters. Mr. Torrey's order is probably not so good as some which have been elaborated in this country, but the method of the book in detail is so good that some faults of arrangement may be allowed to pass, and besides this it must be remembered that the book is not intended for children.

It is possible that on working through the book some faults of detail would be discovered. Many of the experiments described are novel in form, and some seem hardly likely to succeed. For example, on p. 98 an experiment is described, in which manganese dioxide is to be heated in a tube containing hydrogen chloride. The shrinkage of volume on opening the tube below a saturated solution of brine is said to represent the hydrogen which has disappeared. This is obviously wrong, and, practically speaking, the experiment is altogether an undesirable one.

In conclusion, it may be remarked that the book is unusually free from words or pedantries peculiar to America. An exception to this statement occurs on p. 7, where there is a reference to "the graduate being held in front of a dark surface to make the lines show more clearly." The graduate there means a glass vessel and not the careworn teacher.

A. SMITHELLS.

A NEW EDITION OF WHITE'S "SELBORNE."

The Natural History and Antiquities of Selborne, and a Garden Kalendar. By the Rev. Gilbert White, M.A. Edited by R. Bowdler Sharpe, LL.D. Two vols. (London: S. T. Freemantle, 1900.)

IT will be as well to state exactly what is contained in these handsome but rather bulky volumes; the price is high (3*l.*), and purchasers will be glad to know what they are buying. In the first volume are the letters to