real equivalent to Greek. Whatever language a boy presents, we insist that his knowledge of it should be precise. We do not let general information take the place of a knowledge of grammar.

It has been charged by critics of the old system of classical study that Greek has been a college fetich. This certainly has not been the view at Yale. We required Greek in the past not because we worshipped Greek, but because in times past the Greek teachers in the schools were the ones who were best able to insist on certain kinds of training which we thought our students needed. Some schools now have French teachers who can give this same kind of training in French. We are ready to accept the boys from those schools with French instead of Greek. To do this is not a departure from our old principles, but a continuation of it. The majority of French teachers are as yet unable to meet our requirements regarding French. Hence the majority of pupils who try to substitute French for Greek fail. Professor Wright's report shows that it is considered fully as hard to enter Yale without Greek as with it. This proves that the widening of the requirements has not been accompanied by a lowering of the standards.

It is probable that as more teachers of modern languages become acquainted with the requirements of the Yale examination we shall get a larger number of freshmen who prepare in modern languages instead of Greek. But this will not prove that we have changed our standard. It will prove that the schools have changed theirs. By adapting our choice of subjects to the needs of the schools we can make the schools adapt their method of teaching to our needs.

In order to do this we shall probably continue to hold separate examinations instead of joining with other colleges. We recognize the high degree of skill with which the Harvard examinations have been conducted. We recognize also the value of that cooperation between schools and colleges which is exemplified in the management of the Middle States' Examination Board. Under proper restrictions, we can accept some of the results of these examinations in determining the fitness of the pupil to enter Yale. But there is enough difference of purpose between us and Harvard to make a strong argument for those who wish our separate examinations continued —and the demand for their continuance, by the way, comes even more strongly from the schools than it does from the members of our own faculty. The Harvard paper seeks to test knowledge; the Yale paper seeks to test accuracy. The Harvard examination tries to find how well a boy has done his work in school; the Yale examination tries to find how well the boy is going to be able to do his work in college. The Middle States' system is intermediate between the Harvard and the Yale systems in these respects, and it is possible that in the near future we may all come together on this median line. We shall certainly do it whenever the great majority of the secondary school teachers demand it. But the results of the correspondence in the report of the Dean of Yale College indicate that the demand for separate papers is stronger than the demand for one consolidated paper. There is a large number of school teachers who find the accuracy incident to the Yale method of examination a great help in resisting certain evils which the widening of school courses during late years has brought with it.

SCIENTIFIC BOOKS.

Outlines of Industrial Chemistry, A Textbook for Students. By Frank Hall Thorp, Ph.D., Assistant Professor of Industrial Chemistry in the Massachusetts Institute of Technology. Second edition. New York, The Macmillan Co. Price $3.50.

This is a revised and enlarged edition of the work first published by Professor Thorp in 1898. While the earlier edition noted the most important inorganic and organic industries, the subject of metallurgy was entirely passed by because, as the author stated, instruction in it is generally given independently of that relating to technical chemistry. In this newer edition, however, he has thought it best to include an outline of elementary metallurgy and this, therefore, covers 54 pages and constitutes Part III. of the book.

Thorp's 'Chemistry' is too well known to need an introduction to teachers of chemistry, and its well-merited success has brought about a revision that can not but help to make it more generally acceptable for purposes of instruction. While it is obviously impossible for any one man to write with the authority of personal acquaintance with the dozens of distinct industries and hundreds of special manufacturing methods now in active use in this country and abroad, Professor Thorp has made diligent use of the literature, references to which are found at the end of each section, and he has, in his capacity as a teacher, made numerous visits with his classes to industrial plants and witnessed the actual working of many chemical processes. Indeed, the evidence of this is found so unmistakably in his frequent use of workmen's factory terms, given in quotation marks, that it has the effect, not always to be desired, of localizing the particular process described.

In general, the accounts of the individual chemical industries are clearly given, accurate and brought up to date. We note in this connection the account of the sulphuric acid manufacture, in which both the older chamber method and the newer contact processes are very satisfactorily explained and illustrated. The chlorine industry also is very fully treated, although some of the methods described will probably only have an historical interest before many years with the rapid development of the electrolytic methods for chlorine and caustic soda, in which the chlorine is the product for which sufficient utilization has to be sought. These electrolytic processes, by the way, are also very well presented and described.

The account of the manufacture of nitric acid is equally good, embodying as it does recent improvements like Guttmann's and Hart's and the experimental work at Niagara Falls on the production of nitrogen oxides from the action of high-tension electricity on the atmosphere.

We note similarly satisfactory sections on the fertilizer manufacture, and mineral colors or pigments, which latter is quite full and is supplemented by a list of well-selected references.

With these many points of excellence it may be allowed to note one or two cases in which the presentation of the subject is not quite up to the general standard. The statement on page 41 that 'the price of the foreign sulphur brought into this country is too low to allow profitable working of the deposits in this country' was true a few years back, but in 1904 the Union Sulphur Co. of Louisiana produced 200,000 tons of a native sulphur of exceptional purity and began the invasion of the European markets. To prevent the serious crippling of the Sicilian sulphur industry, the Anglo-Sicilian Sulphur Co. has just made a compact with the American Company, by which they give the latter the undisturbed field of the United States and a part of Europe in return for the maintenance of prices. Similarly the statement of the American bromine production methods on page 227 is hardly an adequate picture of the industry which within the last two or three years has had a great development in Michigan, in consequence of the use of electrolytic methods for liberating chlorine.

Part II., devoted to the 'Organic Industries,' covers exactly the same number of pages in the treatment as the Inorganic portion, and is also in the main very satisfactorily dealt with. This is especially true of the section on 'Explosives and on Textile Industries.' The same is true of other sections, although in the account of petroleum we do not find much mention of the radical differences in composition, and consequent differences in practical value, in the American petroleums, such as Pennsyl-

vania, Ohio, California and Texas crudes, that we might expect. In the section on 'Fermentation' also we find no mention of Buchner's great discovery of zymase in the expressed liquid from comminuted yeast-cells, which is now considered as the greatest advance in our knowledge of the action of the yeast plant since the time of Pasteur.

Part III., written for this edition by Charles D. Demond, S.B., in the space of 54 pages, gives a very excellent survey of metallurgical methods, covering all the technically important methods.

The book is undoubtedly the best book of its kind in the English language, covering in one volume of moderate size an outline of the manufacturing methods of technical chemistry. SAMUEL P. SADTLER.

Inorganic Chemistry, with the Elements of Physical and Theoretical Chemistry. By J. I. D. HINDS, PH.D. Second Edition. New York, John Wiley & Sons. 1905. Large 8vo. Pp. viii + 651.

This work, on its first appearance, was carefully reviewed in this journal; it seems necessary, now, only to show in what respects the present edition differs from the former.

The plan of the book remains essentially the same, but there has been an increase of eighty-five pages, and the text has been revised. Several chapters have been enlarged or rewritten, and new chapters have been added. These changes affect mainly 'Theoretical and Physical Chemistry.' The treatment of these subjects is much better and fuller than in the earlier edition, but unnecessary *rules* and questionable statements may still be noticed. Is it well that a student should write structural formulas of acids by the following rule: 'Connect each hydrogen atom by an oxygen atom to the negative, then connect the remaining oxygen atoms, which are saturating, to the negative by both points'? Is it correct to say that 'the reaction of a salt is neutral'?

Although blemishes like the above are still too numerous, they are noticeably less than they were in the first edition. The excellence of the descriptive portion of the text is unquestioned, and the work in its present form should win new friends. L. B. HALL.

HAVERFORD COLLEGE.

Cements, Limes and Plasters, their materials, manufacture and properties. By EDWIN C. ECKEL, C.E., Associate, American Society of Civil Engineers, etc.; Assistant Geologist, U. S. Geological Survey. New York, John Wiley & Sons. 1905.

This is an exceedingly valuable and well-nigh exhaustive work. It is by far the most valuable work on the several subjects that it treats that we have met, and in our judgment may be rightly considered a masterpiece of compilation. In the orderly and systematic arrangement of sub-subjects in the several parts and chapters the author's mastery of his general subject is exhibited not only to his own credit, but to the great pleasure and profit of his readers; for next to the enlightening information conveyed by an author comes the proper unfolding of a subject through systematic arrangement.

It is, however, as an engineer, of broad attainments outside the field of engineering, that Mr. Eckel addresses engineers. He does not profess to be a chemist, the chemistry of cements, limes and plasters is not mentioned in his title, therefore he may be pardoned if in the small space he devotes to the chemistry of these substances he follows the well worn path made by Mr. S. B. Newberry and Mr. Clifford Richardson's committee, which for some reason not clear to the general reader leads direct to the manufacturers of cement, leaving the interests of the *users* of cement completely uncared for. Nothing else could be expected, as Mr. Richardson's committee has the floor, and that committee recommends a method of chemical analysis that is ultimate and that, so far as chemical analysis is concerned, destroys the differences that exist in very unlike cements. A cement that contained five per cent. of uncombined silica and fifteen per cent. of combined silica would show twenty per cent. of silica on analysis by the method recommended by Mr. Richardson's committee, while a cement containing twenty per cent. of combined silica would on ultimate