

## NOTE ON THE DETERMINATION OF SILICA IN BLAST-FURNACE SLAG.<sup>1</sup>

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THE object of this note is to call attention very briefly to the influence of spinel on the determination of silica in blast-furnace slags. When fluxing aluminous ores with magnesian limestone, spinel is very apt to be found in the slag, especially when the slag is basic, the alumina in this case acting as an acid and combining with part of the magnesia to form magnesium aluminate. In the determination of silica in such a slag by the method of fusion with alkaline carbonate, the spinel seems to be almost wholly unattacked by the fusion and subsequent evaporation with hydrochloric acid, and is weighed with the silica at the end of the determination. In the case of one slag, the silica, before purification, was 34.25 per cent.; after purification with sulphuric and hydrofluoric acids, it was found to be 31.52 per cent. The bluish-colored residue left after the sulphuric and hydrofluoric acid treatment was found to dissolve easily in fused potassium bisulphate, and contained alumina and magnesia in the proportions necessary to form spinel. In the case of another slag, the silica, before separation of spinel, was 39.23 per cent.; after separation, 34.73 per cent.

The points it is desired to bring out are, that spinel is not decomposed by the usual alkaline carbonate fusion and, therefore, that it is never safe to omit the treatment of the silica with sulphuric and hydrofluoric acid. All the slags in which spinel was found were stony slags and, therefore, had the usual time in which to cool and crystallize. It is quite possible that, if the same samples had been chilled, the elements of the spinel would have remained in decomposable combination with the silica. However, even in the case of chilled samples, the possible presence of minute crystals of spinel should not be ignored, especially in basic slags rich in alumina and magnesia. By successive and repeated treatment of 100 grams of a powdered spinel slag with hydrochloric and hydrofluoric acids and boiling solution of

<sup>1</sup> Read before the Lehigh Valley Section, May 3, 1894.

sodium carbonate in a platinum dish, it was found to be possible to separate one gram of microscopic crystals of spinel quite free from all impurities.

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### NEW BOOKS.

"AN INTRODUCTION TO THE ORGANIC COMPOUNDS OF EVERY-DAY LIFE." BY JULIUS T. WILLARD, M. SC. 12mo. cloth, pp. IV; 203. Published by the author. Manhattan, Kansas. 1894. Price \$1.75.

Every chemist in this country feels that anything which will tend to place organic chemistry where it belongs in our Colleges and Universities should be encouraged. It was doubtless this feeling which prompted the author to publish this little volume. The book is indeed what it pretends to be, a simple compilation. The arrangement is similar to Remsen and Bernthsen with a few changes which detract somewhat from their systematic and logical arrangement. It is on the whole so much condensed that, well-written as it is, the student must often find difficulty in following the thread connecting the various classes of compounds. The greater part of the book is devoted to the Aliphatic Series more especially to the carbohydrates. This group is neatly compiled but more appropriate for an elementary text of Applied Chemistry. Many of the every-day compounds are barely mentioned and some have been omitted entirely.

The Aromatic Series is too condensed to be of any scientific value to the student. About fifty pages are given to the derivatives of benzene proper, to naphthalene, anthracene, the terpenes, the alkaloids, the glucosides, the proteids and others. There are a good many simple facts stated, and it would seem that the book was perhaps written with the sole object of furnishing the student with these general facts.

It is, however, no longer enough that a text-book of either organic or even inorganic chemistry, be a simple mass of facts and experiments. The subject must be logically presented, leading up to, and proving new facts, by facts already known. At the same time, there must be enough assumed to develop the reasoning powers of the student and to make him feel that he is really doing the work himself. Remsen has struck the key-