

TESTS AND SEPARATIONS.

Under heading "Hydroxides" in digest, the action of Potassium Hydroxide and Ammonia upon solutions of "Alumina—and Chromic—Oxide Salts" has been given.

The Solubility of Aluminium Hydroxide in solutions of Potassium and Sodium Hydroxides and its reprecipitation from Alkaline solutions by Ammonium Chloride, forms the most accurate test for Aluminium in the absence of Chromic Oxide Salts. The presence of the Chromic Oxide Salts is manifested either by the color of the solution, or by the faint yellowish green tint, which they give to a bead of Sodium Metaphosphate, Na PO_3 (obtained by heating the Microcosmic Salt, $\text{HNH}_4 \text{ Na PO}_4$) both in the oxidizing and reducing flame of the blow-pipe, changing to Emerald Green on cooling. It is necessary to remove the Chromium before the test of Aluminium is applied. This is effected by fusing the mixed oxides with Sodium Carbonate and Potassium Chlorate (two parts of each reagent are taken to one of the mixed Oxides) in a platinum crucible. If the yellow mass obtained be boiled in water, the whole of the Chromium is dissolved as potassium Chromate, part of the Aluminium as Potassium Aluminate, the rest of the Aluminium remaining undissolved. If the solution be acidified with Nitric Acid, and Ammonia then added to feebly Alkaline reaction, the dissolved portion of the Aluminium separates.

If any compound of Aluminium, after ignition upon Charcoal before blow-pipe, be moistened with a solution of Cobalt Nitrate and again strongly ignited, an unfused mass of a deep sky blue color is produced.

All the Salts of Chromium give to Borax bead before the blow-pipe in reducing flame an Emerald Green color.

The Chromous and Chromic Hydroxides are characteristic for the Chromous and Chromic Salts.

In solutions of Chromic Acid $\text{H}_2 \text{ CrO}_4$ and Chromates (the Alkali Chromates are soluble in water.)

(1.) *Barium Chloride* throws down a yellowish white precipitate of Barium Chromate, BaCrO_4 , Soluble in dilute Nitric and Hydrochloric Acids.

(2.) *Lead Acetate*, a yellow precipitate of Lead Chromate PbCrO_4 , soluble in Potassium Hydroxide, sparingly soluble in dilute Nitric Acid, insoluble in Acetic Acid.

(3.) *Silver Nitrate*, a dark purple red precipitate of Silver Chromate $\text{Ag}_2 \text{ CrO}_4$, soluble in Nitric Acid and Ammonia.

Chromic Acid and soluble Chromates give to a very dilute Acid solution of Hydrogen Dioxide, covered with a layer of ether, a fine blue color. This reaction is very characteristic, being distinctly produced in a solution of one part of Potassium Chromate in 40,000 parts of water.

PUBLIC SCHOOL DEPARTMENT.

Graded Course of Instruction.—Third Book.—Continued from May Number.

FIFTH GRADE.

(Time allowed—About 5 months.)

READING.

The first 80 pages of the Third Reader. To be copied on slates in preparation and read from slates by the pupils. It thus becomes a lesson

in composition, punctuation, capitals, spelling, writing and reading. Continue it through all the succeeding grades. Reading is largely an imitative art; read well yourself and encourage your pupils to imitate you. Good reading is something more than being able to *speak all the words*. Secure the *talking*