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# Borates of magnesia

M. Wöhler

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To prove that it contained no hydrogen, the black powder was mixed with peroxide of copper, and heated as in vegetable analyses; but the quantity of water obtained was such as to show that it could not contain  $\frac{1}{100}$ th of its weight of hydrogen, and it is most probable that it did not contain any. On account of the difficulty of drying, the water was undoubtedly hygrometric. These experiments appear sufficient to prove that the supposed hydruret of platina is merely an alloy of iron and platina.

Descotils obtained from an alloy of platina and zinc, by means of dilute sulphuric acid, a black powder, which inflamed below a red heat. M. Boussingault found that it contained 31 per cent. of zinc, and its weight after combustion increased like that of the alloy of iron and platina. M. Boussingault proposes to examine, at a future opportunity, the black scales which Davy obtained by treating an alloy of platina and potassium with water, and which he considered as a hydruret of platina.—*Ann. de Chim. et de Phys.*, tom. liii. p. 441.

#### BORATES OF MAGNESIA. BY M. WÖHLER.

The boracite is a well known crystallized mineral, composed of boracic acid and magnesia. When solutions of borate of soda and borate of magnesia are mixed, no precipitation takes place until the mixture is heated, and then an abundant white precipitate is formed, which redissolves as the solution cools.

A solution in which the crystals had redissolved was exposed for several months to a temperature below  $32^{\circ}$  of Fahr. During this exposure, fine radiated acicular crystals were formed, some of them half an inch long: they were so slender that it was not possible to determine their crystalline form. These crystals are transparent, brilliant, hard and brittle, and perfectly insoluble in water, either cold or hot. Muriatic acid when hot decomposed these crystals, boracic acid being deposited on cooling; when heated they became opaque and lost water. By analysis this salt yielded

Boracic acid	.....	25
Magnesia	.....	16.67
Water	.....	58.40

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100.07

The boracic acid and magnesia are in the same proportion as in boracite. In the case of this salt we have additional examples of the endless variety of symbols now inflicted upon the chemist. In the

*Ann. de Chimie et de Phys.* it is represented by  $\text{Mg } \overset{\text{iii}}{\text{B}}^3 + 16 \text{ H}$ , while in the *Journal de Chimie Médicale* we have  $(2 (\text{Mg o}) + \text{B o}^6 + 16 \text{ H}^2 \text{ o})$ , and yet both writers agree in considering it as similar to boracite combined with 16 atoms of water. Both differ from Berzelius.

From the solution which yielded these crystals there afterwards separated abundance of large brilliant, hard, transparent crystals in the form of oblique rhombic prisms.

This salt was found to be a double borate of soda and magnesia: when heated it swelled, and lost 52.5 per cent. of water of crystallization. The calcined residue redissolved in water, but so slowly that

it seemed at first to be insoluble : the solution was alkaline, and was not precipitated by ammonia. It has the characteristic property of becoming turbid when it is heated to about 160° Fahr. and depositing a great quantity of a white precipitate, which gradually redissolves as the solution cools. It is owing to the formation of this salt in the mixture of solutions of sulphate of magnesia and borax, that a precipitate is occasioned when it is heated. This precipitation is occasioned by the formation and precipitation of sub-borate of magnesia, while borate of soda and boracic acid remain in solution. On evaporating the liquor separated by filtration from the precipitate, boracic acid evaporates with the water, and a saline mass is obtained, from which alcohol separates a quantity of boracic acid. This sub-borate of magnesia is most readily obtained by heating a mixture of solution of borax and sulphate of magnesia.

Hydrate or carbonate of magnesia dissolves in a hot solution of boracic acid. The solution is alkaline : by evaporation it deposits a salt in crystalline grains, which is very soluble in water, although the solution goes on slowly. The solution is not precipitated at a high temperature, but when mixed with a solution of borax, it deposits a white precipitate if heated to about 160°. The precipitate disappears at common temperatures.

This borate of magnesia when heated to redness loses much water and boracic acid. The residue has the appearance of pumice-stone : water dissolves much pure boracic acid from it, and pure magnesia remains. It appears, then, that at high temperatures the affinity between magnesia and boracic acid is entirely destroyed.—*Ann. de Chim. et de Phys.*, tom. liii. p. 433.

#### ACTION OF TANNIN AND SOME OTHER SUBSTANCES ON THE ROOTS OF PLANTS. BY M. PAYEN.

It has been repeatedly stated by M. Silvestre, Jun., that trees soon died when their roots came into contact with the remains of the roots of oak trees cut down near them. This was supposed by some to be owing to the action of tannin, while others maintained that it was innocuous. M. Payen instituted direct experiments on this subject. In order to observe the influence of tannin and to appreciate its effects comparatively with those of other agents, M. Payen placed grains of wheat, rye, barley, oats, and maize, in contact with equal quantities of the following liquids, and all other circumstances were equal : 1st, aerated distilled water ; 2nd, the same containing 0.01 of its weight of a saturated solution of carbonate of soda ; 3rd, the same containing only 0.001 of its weight of the same saturated solution of carbonate of soda ; 4th, a solution containing 0.001 of pure tannin ; 5th, a solution containing 0.001 of sulphuric acid ; 6th, distilled water saturated with lime.

In the distilled water, in the liquid containing 0.001 of solution of carbonate of soda, and in the solution of tannin, germination took place in the order stated ; in the three other liquids, those containing 0.001 of acid, 0.001 of carbonate of soda, and saturated with lime, germination did not occur.