NOTES.

ON THE RESERVE-CARBOHYDRATES OF THE BULB OF THE HYACINTH (*Hyacinthus orientalis*, L.).—Leclerc du Sablon states, contrary to previous workers on the subject, that the reserve-carbohydrate associated with starch in the bulb-scales of the Hyacinth is dextrin. In a paper in 1898¹, on the carbohydrate reserve-materials of bulbs and tubers, he characterizes the Hyacinth as agreeing with *Ophrys*, *Lilium*, and *Tulipa*, in possessing both starch and dextrin in its organs for storage. In a more recent paper², he again draws attention to the occurrence of dextrin, as a reserve material, in the Hyacinth, Tulip, Lily, and Asphodel.

Chevastelon³ in 1894 examined amongst other reserve-organs the Hyacinth bulb, and describes the soluble reserve-carbohydrate as a kind of inulin.

In a recent publication⁴ on the carbohydrates of Monocotyledons, I have called attention to Chevastelon's work, and also have placed the Hyacinth bulb, from my own microscopic and microchemical examinations, in the group of reserve-organs containing both starch and an inulin easily soluble in cold water. Since the presence of inulin in this bulb was inferred, and not proved chemically, I have deemed it expedient to perform the experiment now to be described.

The scales of the bulb were mashed up and extracted with cold water. Alcohol was gradually added to the extract. Some flocculent matter first separates out; this is chiefly the mucilage of the raphide-cells, which is rendered insoluble by a lower percentage of alcohol

¹ Leclerc du Sablon, Les réserves des bulbes et des tubercules. (Revue Générale de Botanique, 1898, p. 387.)

² Ibid., Sur la dextrine considérée comme matière de réserve. (Comptes Rendus, cxxviii, 1899, pp. 944, 945.)

³ Chevastelon, J., Pharmacie, 1895 [6], pp. 83-6, from Inaug. Diss. Paris, 1894.

⁴ Parkin, Phil. Trans. Royal Soc. Lond., Series B, vol. cxc (1899), pp. 56 and 72.

than the inulin. The mucilage is removed by filtering and more alcohol is added, when a dense white precipitate is produced, which gradually settles to the bottom of the vessel. This is the inulin. The alcohol is poured off and the precipitate dissolved in a little cold water, and the solution treated again in a similar manner with alcohol. The operation can be repeated a third time, when a fairly pure substance is obtained.

1.457 grams of this, dried at 100° till constant in weight, was taken and dissolved in water, and the volume made up to 100 cubic centimetres.

Angle of rotation in the 200 mm.
tube of the polarimeter = -1.2° .

50 c.c. were acidified with oxalic acid to the extent of 1 per cent. and heated for an hour on a water bath.

After hydrolysis the angle of
rotation in the 200 mm. tube = -2.5° .

I then took 10 c.c. of the hydrolysed portion, and boiled this for a definite time with a definite amount of Fehling's cupric reagent. The cuprous oxide was collected on an asbestos plug, reduced to copper in a current of hydrogen and weighed.

10 c.c. yielded 0.2475 gram of copper. This calculates out to 1.363 gram of fructose (levulose) in the 100 c.c. Theoretically there should be 1.618 gram of fructose yielded by the 1.457 gram of inulin originally taken. The discrepancy is probably due to impurity in the inulin, or possibly to reversion-products formed in the hydrolysis.

The amount of fructose calculated from the opticity (taking the specific rotatory power of fructose at a temperature of 15° to be -98.8°) is 1.265 gram, which corresponds fairly well with that derived from the cupric-reducing power.

The specific rotation of the inulin, deduced from the observed angle, is about -45° , a number agreeing closely with such obtained for other monocotyledonous inulins¹.

The above results lead to the view that the carbohydrate in question is of the nature of inulin, yielding fructose on hydrolysis.

There seems then no doubt that the reserve-carbohydrate accompanying the starch in the Hyacinth bulb, is inulin rather than dextrin, using the word inulin in its extended sense for all those

¹ Tollens' Handbuch der Kohlenhydrate, Band ii, pp. 239, 240.

Parkin, John. 1900. "On the reserve-carbohydrates of the bulb of the hyacinth." *Annals of botany* 14, 155–156.

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