CLIX. THE OCCURRENCE OF SUGAR ALCOHOLS IN MARINE ALGAE. DULCITOL.

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STENHOUSE [1844] by isolating mannitol from a number of brown algae established for the first time the occurrence of a sugar alcohol in marine algae. In recent years the subject has been re-investigated by Kylin [1913, 1915], who attempted to estimate the amount of mannitol in different weeds by isolating the crystallised product and weighing it. In the course of an examination of the two brown seaweeds *Pelvetia canaliculata* and *P. canaliculata forma libera* [Haas and Hill, 1929] some difficulty was experienced in isolating the mannitol in crystalline form from the extracts obtained, a fact which was attributed to the presence of the non-crystallisable anhydride mannitan, which substance can also be classed as a sugar alcohol. The presence of both these substances was however established by the preparation of their respective benzylidene derivatives. Kylin [1915] in addition to examining a number of brown weeds also examined four red weeds for the presence of mannitol but in each case failed to find any of this substance. It therefore seemed to us to be of interest to ascertain whether the red alga *Bostrychia scorpioides* contained mannitol, since this weed grows on the salt marsh at Blakeney Point in close association with *P. canaliculata forma libera* and is thus exposed to conditions which are quite abnormal for a red weed. To this end the oven-dried weed was ground, sieved and extracted with boiling 60 % alcohol; the extract, after removal of the alcohol, was treated with basic lead acetate and filtered, and the filtrate was freed from lead by sulphuric acid. The resulting solution was then evaporated over a water-bath in the presence of calcium carbonate to ensure a neutral reaction. The residue thus obtained was a brown opaque pasty mass; it was extracted with boiling absolute alcohol, and the extract on evaporation gave a clear brown syrup, which, on standing for some weeks, deposited crystals. By the gradual addition of an equal volume of alcohol, in small quantities at a time with constant stirring, the crystals were separated from the brown supernatant fluid; they were found to be readily soluble in water but insoluble in alcohol and were accordingly dissolved in water, decolorised with charcoal and crystallised three times from alcohol and water, when they were obtained as glistening

monoclinic prisms melting at 186–187° (uncorr.). They gave the following result on analysis:

	C %	H %
Found	39.85	7.86
Calc. for $C_8H_{14}O_6$	39.56	7.69

When mixed with an authentic sample of dulcitol the melting-point remained unaltered but when mixed with a sample of mannitol of m.p. 163–165° the resulting mixture melted at 152–156°.

These facts in themselves are sufficient evidence that the substance was dulcitol but, to place the matter beyond doubt a small quantity was oxidised with nitric acid and was found to yield mucic acid m.p. 213°.

The occurrence of dulcitol has not previously been recorded in seaweeds, and this is indeed the first time that any sugar alcohol other than mannitol, or its anhydride, has been observed to occur in these plants. It is proposed to examine a number of other red weeds for this substance, but in the meantime it is worthy of note that the occurrence of dulcitol in a group of seaweeds which are known to contain galactose as a cell-wall constituent forms a striking parallel to the occurrence of mannitol in the brown weeds whose cell-wall has been shown to contain mannuronic acid [Bird and Haas, 1931].

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