Concluding Remarks

The investigations described in the previous chapters were undertaken for the purpose of characterising the polysaccharide present in the kernel of water chestnut. The starchy nature of the kernel had already been reported in the literature. Those starches on which detailed structural investigations have been carried out belong either to the class of tuber starches or to cereal starches. Water chestnut starch possesses the peculiarity that it originates from the kernel of an aquatic plant.

Crude water chestnut starch obtained by macerating the kernel showed the presence of protein. Its granules resembled those of potato starch. X-ray powder diagram belonged to A-type (Fig-7). The purified and defatted starch showed an amylose content of 15% from iodine binding power measurements. The components were separated through complex formation with thymol. The amylose complex was further purified by repeated "recrystallisation" from butanol. The purified components showed the following characteristics:
Methylation and periodate oxidation studies on amylopectin indicated the presence of 1 → 4 linked chains of anhydroglucose units, with branches originating at C6 from 87% of the branched units and at either C2 or C3 in the case of the rest.

Methylation and periodate oxidation studies revealed the predominance of 1 → 4 linkages in the amylose molecule. Hydrolysis to the extent of 73% with purified β-amylase indicated the presence of unusual linkages invariably encountered in amylose samples from other sources. Complete hydrolysis using crude β-amylase, however, definitely shows the absence of contamination with branched molecules.
The intrinsic viscosity of amylopectin (0.97) and its molecular weight (23 \times 10^6) determined by light-scattering measurements are within the expected range.

The D.P. of amylose calculated by end group assay methods (370) and viscosity measurements (430) are also within the expected range. The molecular weight of the acetate determined from light-scattering measurements in chloroform solution was, however, found to be $6.7 \times 10^6$. Nevertheless a value of $3 \times 10^6$ has also been reported for corn amylose.

Water chestnut starch, therefore, appears to be similar in composition to starches from other sources. The detailed molecular architecture, size and shape of the components are also of the same type.