health before the animal began to refuse food, and presaging the fatal change. But too much stress ought not to be laid on this or on the terminal "concentration" of the blood. The latter is seen in dog 1035, which is for this reason included in the table, although in all probability it did not die of adrenal deficiency. In dog 1034, instead of a concentration, there is some dilution of the blood after removal of the second adrenal, although the terminal concentration is seen. In this animal during the period of good health there was one apparent relapse, when the blood sugar sank to 0.045 per cent., and it looked as if the animal was going to die. She recovered, however, and lived a fortnight longer.

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Starch grains of wheat considered as partially dehydrated amylose.

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Alsberg and Perry[1] have shown that about 60 per cent of the starch grains is soluble in cold water if it is ground for several days in a pebble mill. This fact will be used in this paper as a basis for an explanation of the properties and structure of wheat starch grains. The assumption that amylose occurs in starch grains in different stages of dehydration proved to be the most satisfactory working hypothesis. We will assume the grains to be built up of alternate layers of more hydrated amylose (less refractive rings) and of less hydrated amylose (refractive rings, to which belongs the surface ring). If we follow the terminology of Meyer, without accepting his theory in detail, the former, β-amylose, is not only soluble in hot water, but also in cold water; the latter, α-amylose, is not soluble in boiling water at 100° C. Of the α-amylose rings, the surface ring is the denser and the more dehydrated. It has a low swelling capacity at room temperature. Though the inner layers, being less dehydrated, tend to have a higher water content and to elongate their circumfer-

[1] Alsberg, C. L., and Perry, E. E., PROC. SOC. EXP. BIOL. AND MED., 1924, xxii, 60-61.

ence, the surface ring does not allow this. In this way, there exists an equilibrium between the swelling capacity of the inner layers and the cohesion (elasticity) of the surface layer. If the cohesion of this border layer is decreased or destroyed (by damaging), the equilibrium is broken and more water can be taken in. If this cohesion is decreased in additional α-amylose rings, greater swelling occurs, and β-amylose leaches out; if the cohesion is destroyed in still more rings (by damaging), all the β-amylose dissolves and diffuses out. The last phenomenon is caused by grinding, by which all the α-amylose rings are crushed and their continuity broken, so that the β-amylose, or 60 per cent of the total starch grains, goes into solution in the surrounding water. If these grains show places where the surface is less refractive (clear in light field and non-luminous if direct light is shut off) they are swollen unilaterally or locally. They are the first to swell if they are hydrated (by heating or by KOH) and the clear places are the first to become deeply colored in a weak I-KI solution. By heating above $\pm 50°$ C. the hydration of the refractive rings (including the surface ring) increases; they are no longer continuous, but are broken locally into small granules, so that swelling occurs. After heating for a short time at 100° C. the surface ring forms a bag around the liquid β-amylose which is in solution in the interior. Treatment with tannin produces a precipitate on the outside and inside of the bag; α-amylose and β-amylose pass gradually without sharp transition point one into the other. There is only a quantitative difference in hydration between them. If the dehydration passes beyond a certain limit, agglomeration occurs, so that the α-amylose no longer disperses in water. The greater the degree of dehydration, the more promptly must we hydrate to reconvert it into β-amylose. We can then increase hydration of amylose by:

(1) Heating in water. The higher the temperature, the more hydration.
(2) KI, $Ca(NO_3)_2$, $ZnCl_2$.
(3) KOH, Na_2CO_3.
(4) Diluting with water.

We can decrease dehydration of amylose by:

(1) Lowering the temperature.
(2) Alcohol, chloroform.
(3) Tannin.

(4) Withdrawing water and concentrating the solution.

After having increased hydration in one of the four ways, we can use one of the four ways of decreasing hydration, and vice versa.

In this way, retrogradation and its different rate under different conditions can be explained.

The surface ring is always the most dehydrated part of the starch grain in agreement with the Gibbs theorem, by which the substance with the lowest surface tension is accumulated in the surface.

Crystals, in forms of needles or bars, were observed, not only when a concentrated solution of amylose was heated to 100° C., but also when an amylose solution was allowed to dry out at room temperature.

Iodine-potassium-iodide colors starch more readily and more purely blue, the more the amylose is hydrated. All shades between red and blue-black can be observed. Attention is called to the fact that potassium iodide itself has a strong hydrating power. A connection between its hydrating power and its coloring power is suggested.

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Transmission of dengue fever by mosquitoes.

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This summarizes the results obtained in an extensive series of experiments relating to the transmission of dengue fever by mosquitoes. The investigations have been pursued by the U. S. Army Medical Department Research Board at the Bureau of Science and at the Sternberg General Hospital in Manila, P. I.

Part I of the report considers the plans and arrangements made and the preliminary work done in preparation for the actual experimental work. Part II concerns itself with the various sets of experiments made, the results obtained and the conclusions drawn therefrom.