SOME LABORATORY NOTES ON PAPOID DIGESTION.

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For some time it has been known that the stems, leaves and unripe fruit of a plant called *Carica papaya* contain a ferment capable of digesting proteids. This plant is found in the East and West Indies, and in South America. The natives of many localities where this plant is indigenous making a practice of rolling their fresh meat in caraca leaves to make it tender and easier of digestion. From the juice of this plant Dr. Finkler, of Bonn University, has made an albuminous preparation containing the ferment, which is now attracting much attention under the name of papoid.

Wurtz, however, was the first to isolate the ferment, to which he gave the name of *papaïn*, and ascribed to it certain definite and characteristic reactions.

About 90 per cent. of commercial papoid is soluble in water; the residue consists chiefly of coagulated albumen. The solution contains globulin, but it is highly probable that the ferment is quite independent of this albuminoid, as the globulin may be precipitated, leaving in the solution a large part, if not all, of the ferment.

As papoid contains the ferment papaïn and also some albumen on which it may act, care must be taken to keep it dry. The unsatisfactory results obtained by some in its use are no doubt due to previous exposure of the sample to moisture. A solution of papoid will always give the peptone reaction on standing a few hours.

The greatest differences of opinion have been expressed by different experimenters as to the conditions most favorable to the activity of papoid. Albrecht (*Schmidt's Jhrbuch*, Bd. 190) states that papaïn digestion is hastened by the presence of hydrochloric acid. Wurtz, on the other hand, shows that papaïn digestion is essentially a neutral one, which is most rapid and thorough at a temperature of about 40°. Rossbach has recorded a few experiments—at variance with most others—in which he claims that this ferment is not more active in a warm solution than in a cold one. As papaïn is a vegetable product, this seems highly probable, but the careful experiments of Dr. Sidney Martin fully prove that a modern degree of heat increases the activity of this ferment just as it does that of any other. The fact remains, however, that papaïn has powerful digesting action at ordinary temperatures—50°–70°F.

Dr. Martin has published at some length a series of carefully made experiments on the nature and action of papain in the *Journal of Physiology*, Vols. V. and VI., and the results of the following experiments, where they run parallel with his, closely correspond with the results obtained by this author :— . . . .

The action of papoid in neutral solution on diphtheritic membrane compared with that of pepsin :

(*a*) Papoid digested completely .3 grm. of diphtheritic membrane in 20 hours.

Pepsin had only partially dissolved the same weight of membrane at the end of 36 hours.

(*b*) Papoid dissolved completely .5 grm. of membrane in 23 or 24 hours.

In these experiments a 5 per cent. solution of papoid or of pepsin was added to the undivided membrane, and the whole kept wet during the time specified. The membrane was reduced to a clear fluid jelly by papoid, but only partially attacked by the pepsin under the same conditions.

The conclusions to be drawn from these experiments are obvious. Papoid evidently contains a powerful proteolytic ferment which resembles trypsin both in the conditions under which it is most active and in its mode of digestion. It corrodes the fibrin, dissolving each piece away from the surface to the centre, and does not gelatinize the whole mass like pepsin. Moreover, one can readily obtain leucin in the products of digestion. Tyrosin could not be obtained by the writer, but its presence was determined by Dr. Martin, who worked with larger digestion mixtures.

Papoid is especially useful for removal of diphtheritic membrane. The conditions present in the pharynx are just those which retard the action of pepsin and pancreatin, but do not influence papoid. The medium in which it is