consisted of the sterilized Ringer's Solution as a medium. Larvae in a few cases were able to live for a significantly longer time in soluble starch, sucrose, xylose, glycogen, tyrosine, and cystine than in the checks.

Owing to these indefinite results, an attempt was made to isolate enzymes from the gut of the larvae of *Aedes aegypti* Linn and *Culex quinquefasciatus* Say. The intestinal tracts were dissected out, placed in 50% glycerin and stored in lots of 200 each. Before use these were finely ground up in an agate mortar. Technique in the main has been modified after Wigglesworth[4, 5] and Swingle.[6] Positive reactions to date have resulted in tests for amylase, invertase (sucrase), xylanase, and a protease acting in alkaline medium. Negative results were obtained in tests for maltase, lactase and a protease acting in acid medium. It is quite probable that a lipase is present in both of these species.

A comparison of the results of the rearing experiments with those of the isolation methods indicate that starch, sucrose and xylose, in certain instances, supported larval life for a significant period and that enzymes for the hydrolysis of these carbohydrates were detected in the digestive tracts of larvae. On the other hand, tests with maltose and lactose were negative according to both methods.

6147

Effect of Human Blood Serum on the Toxicity of Bile Salts.*

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Approximately two dozen white mice were used in these experiments. The effect on the toxicity of bile salts when injected intraperitoneally was observed, using normal saline and blood serum as vehicles. The lethal dose of stock bile salts[1, 2] dissolved in normal saline had previously been found to be 0.009 gm. This product

[4] Wigglesworth, V. B., *Biochem. J.*, 1927, **21**, 797.

[5] Wigglesworth, V. B., *Biochem. J.*, 1928, **22**, 150.

[6] Swingle, H. S., *Ann. Ent. Soc. America*, 1928, **21**, 469.

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[1] Merck & Co., "Sodium Taurocholate".

[2] Williams, J. W., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 637.

contained proteins, etc., which were removed, since they might influence the results. The procedure consisted of cleaning with chloroform and ether and dissolving the solid matter in alcohol. The alcoholic solution cleared by standing was pipetted off, filtered, and evaporated and the residue dried in a hot air oven. The residue was then immediately weighed so as to obviate as much as possible the adsorption of water which factor would necessarily influence the weight.

The solutions when made up contained 0.001 and 0.002 gm. of bile salts to the cc. Their slight variation in acidity was not sufficiently marked in the author's experience to influence the results. The surface tension estimated by the drop method for the serum and saline salt mixtures was virtually the same for like concentrations of the salt.

When normal saline was used as a vehicle 0.009 gm. of bile salts were found lethal as in previous experiments.[1] When fresh human serum (not older than 3 hours) was used in a like capacity, at least twice the amount was necessary to insure a fatal outcome. Thirty-six hours were considered a logical time over which to read results, especially since animals which did not die within that time survived.

We observed that human serum is protective toward this toxic product. It is questioned that this is due to the presence of a developed resistance on the part of the body. The author by repeated injections has attempted to observe such a development of resistance in rabbits. Normal saline was used as a vehicle with the impure salt as solvent. The 5 rabbits used died in the process of the experiment although the dose was not increased. This would indicate, if anything, an accumulative effect. However, this list of experiments is not sufficiently great to draw conclusions and work on a larger number of animals is necessary. In addition purified salt may give better results since allergy might have played a part.

In explanation, it is thought that there is alteration of the disperse system of the blood serum. Possibly the bile salt with its greater surface tension adheres as a film to the serum molecule and in this manner delays the absorption of the toxic moiety, so that the body is at no time exposed to a lethal dose when less than 0.02 gm. is given. It is logical that the serum may also possess a neutralizing effect. This short piece of work and its discussion brings to the fore medicated serums and suggests the possibility of their use other than in the field of spinal lues.