the wounds revealed the presence of gas bacilli *(B. welchii)* in each animal.

The accidental contamination of traumatized wounds, either by clean wool cloth or wads from shot gun shells will result in the development of gas bacillus infection.

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Enzymes in the Alimentary Canal of Mosquito Larvae.

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An attempt has been made to determine the presence of enzymes in the digestive tract of certain species of mosquito larvae. Phillips[1] and Bertholf[2] demonstrated the presence of enzymes in the honey-bee, both larvae and adults, by feeding them on solutions of chemically pure carbohydrates and comparing the length of life in contrast to controls fed on water alone. By this method they hoped to eliminate the interference of any enzyme from the tissues surrounding the gut, a difficult matter in isolation techniques. However these workers did not exclude microorganisms from the alimentary canal and it is conceivable that organisms hydrolysed the carbohydrates which were able to maintain the insects alive for considerable periods.

The writer applied this method to *culicid* larvae and endeavored to exclude bacteria, etc., by sterilizing all media, either by autoclaving or filtering. Mosquito eggs disinfected in Hexyl Resorcinol (Hinman[3]) were introduced into solutions of chemically pure compounds, dissolved in a modified Ringer's Solution and incubated at a suitable temperature. Soluble starch, sucrose, galactose, xylose, levulose, lactose, maltose, glycogen, creatinine, cystine, tyrosine, a mixture of tyrosine and glycogen, a mixture of sucrose and tyrosine, have all been used. Solutions varied in strength from 0.1% to 1.0%. The results of these experiments have been rather inconclusive owing to inconsistency when repetitions were made. Checks

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1 Phillips, E. F., *J. Agric. Res.*, 1927, **35**, 385.

2 Bertholf, L. M., *J. Agric. Res.*, 1927, **35**, 429.

3 Hinman, E. H., *Am. J. Trop. Med.*, 1932, **12**, in press.

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.

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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.