TABLE I.

| Group I (Control) | Group II (Na pantothenate) | Group III (Hydroxypantothenic acid) | Group IV (Na pantothenate plus hydroxypantothenic acid) |
|---|---|---|---|
| ♂ 49 g | ♀ 95 g | ♀ 61 g | ♀ 110 g |
| ♂ 56 | ♀ 89 | ♂ 78 | ♂ 78 |
| ♀ 30 | ♂ 121 | ♀ 62 | ♂ 115 |
| ♀ 20 | | | |

It can be seen from the data in Table I that the rats which received either synthetic Na pantothenate or synthetic hydroxypantothenic acid demonstrated a greater growth response than did control rats which received all of the known vitamins other than pantothenic or hydroxypantothenic acid. The growth response was greater in the Na pantothenate group than in the hydroxypantothenic acid group, indicating that although hydroxypantothenic acid has a stimulating effect, it is not a complete substitute for Na pantothenate in the nutrition of the rat. The two acids do not appear to supplement one another.

*Summary.* Rats maintained on a basal sucrose diet supplemented with vitamin $B_1$, riboflavin, vitamin $B_6$, choline, nicotinic acid, vitamin C, vitamin K, halibut liver oil, alpha tocopherol, and linseed oil exhibit a definite growth response following the addition of synthetic Na pantothenate or hydroxypantothenic acid. The growth response is greater in rats receiving Na pantothenate than it is in rats receiving hydroxypantothenic acid, indicating that Na hydroxy pantothenate is an incomplete substitute for Na pantothenate.

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11751 P

## Physiology of a Pure Culture of *Trichomonas vaginalis*. I: Population in Relation to pH.*

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The effect of pH upon the growth of *Trichomonas vaginalis* is probably related to the problem of clinical control of the organism

* The author wishes to thank Dr. T. L. Jahn whose advice has made this work possible, and Mr. Ray E. Trussell who aided materially in getting the work under way.

in cases of natural infection. This paper concerns the extremes of pH which will support growth *in vitro* and the optimum pH for the multiplication of the organism in bacteria-free culture.† [1]

The culture medium used was Difco liver infusion agar slants overlaid with 5% human serum in modified Ringer's solution sterilized by filtration.‡ The pH of both the agar slants and fluid medium was adjusted with N/1 HCl and buffered with 0.25% sodium phosphate. The incubation temperature was 37.5 ± 1°C. The pH determinations were made with a glass electrode which was checked against two standard buffers.

The organisms were counted in a hemocytometer after 2, 4, and 6 days of incubation. Each count included 10 large squares, having a total volume of 1 cu mm. Six cultures were examined at each pH except in those cases where extraneous circumstances reduced the number to 5. Only minor shifts in pH were observed during incubation and the experimental cultures did not vary markedly from the uninoculated control tubes. The greatest difference between

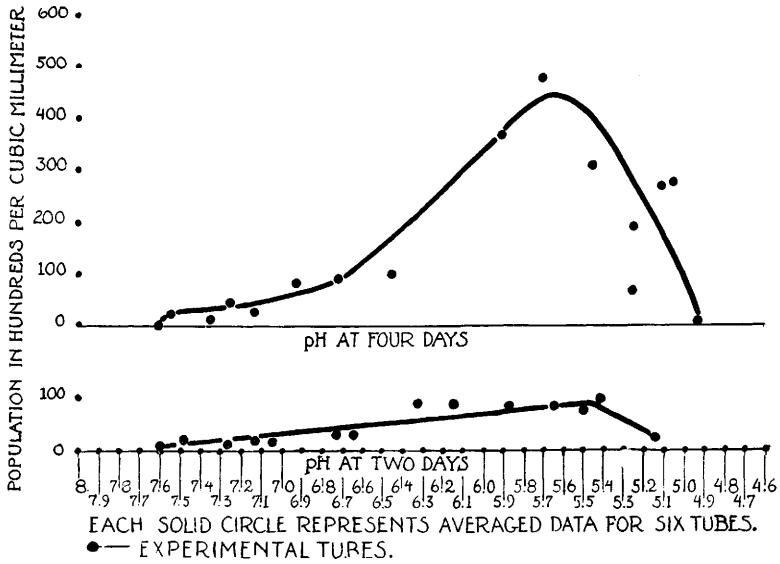


CHART I.

Explanation of Chart for Series II, Two and Four Days.

**The pH of the cultures at the time of counting is plotted on the abscissa. The population in hundreds per cubic millimeter is shown on the ordinate. The curve for four-day cultures is concave in the upper ranges where the shift in pH in both experimentals and controls was away from the optimum.**

† The pure culture used in these experiments was isolated by Mr. Ray E. Trussell who kindly placed it at the author's disposal.

1 Trussell, Ray E., *J. Iowa State Med. Soc.*, 1940, **30**, 66.

‡ Modified Ringer's solution: NaCl, 0.6 %; $NaHCO_3$, KCl, $CaCl_2$, 0.01 %.

experimental and control tubes was found to be 0.3 of 1 pH unit on the fourth day. Blood agar or chocolate agar plates were used to detect bacterial contamination at the conclusion of each experiment. Three cultures out of 305 used in 2 series and one subculture were found to be contaminated.

Optimum growth after 2 days' incubation occurred between pH 5.45 and 5.55, while after 4 days it was between 5.5 and 5.8. The highest pH supporting growth after 4 days was 7.55, the lowest 4.9. Two tubes out of 6 showed no live organisms at pH 4.9 after 4 days. Subculture on the sixth day revealed that the organisms had lost their viability above pH 7.55. (These data are taken from the second of 2 series of experiments with quite parallel results.)

11752 P

## Alimentary Azotemia Due to Whole Blood Absorption from the Gastrointestinal Tract.

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In the past six years numerous authors have reported an increase in blood urea nitrogen in certain cases of bleeding peptic ulcer. These include the reports of Sanguinetti,[1] Christiansen,[2] Meyler,[3] Alsted,[4] Sucic,[5] Schiff and Stevens,[6] and Stevens, Schiff, Lublin and Garber.[7] The chief theories to explain this increase were dehydration, shock, hepatorenal damage, hypochloremia, starvation and absorption of digested blood. Certain workers[2, 7] as well as Kaump and Parsons[8] believed that the last named factor (absorption of digested blood) is the most important. Our experiments tend to corroborate this conclusion.

*Method.* Citrated blood was given by stomach tube to 6 healthy dogs in 12 experiments (in 2 of these experiments dog blood and

1 Sanguinetti, Lucio V., *Arch. Argentinos de enfermedades de Aparato Digestivo y de la Nutrición*, 1934, **9**, 264.

2 Christiansen, Tage, *Acta Med. Scand.*, 1935, **85**, 333.

3 Meyler, L., *Acta Med. Scand.*, 1935, **87**, 313.

4 Alsted, G., *Am. J. M. Sci.*, 1936, **192**, 199.

5 Sucic, Dinko, *Klin. Wchnschr.*, 1935, **14**, 1316.

6 Schiff, L., and Stevens, R. J., *Arch. Int. Med.*, 1939, **64**, 1239.

7 Stevens, R. J., Schiff, L., Lublin, A., and Garber, E. S., *J. Clin. Invest.*, 1940, **19**, 233.

8 Kaump, D. H., and Parsons, J. C., *Am. J. Dig. Dis.*, 1940, **7**, 191.