the number of variables which have entered into the experiments; particularly is this true in the experiments performed with farm animals and with mixed feeds of variable composition. We have approached the problem by means of the more recent methods of animal feeding and have adopted a standard basal ration in which protein and inorganic salts have been kept as constant as possible. After evisceration, the fat from the whole animal has been rendered in an autoclave kept under constant pressure for 14 or 15 hours. Our results have shown marked variations due to high carbohydrate feeding and the feeding of different oils. For example, with a preponderance of starch in the diet, a characteristic "hard" fat is obtained, while with the different oils typical "oily" fats are obtained. These "oily" fats give varying iodine numbers and refractive indices depending upon the oils fed. Solid fats are being fed in other diets. The conversion of an "oily" fat into a solid fat with high carbohydrate feeding is at present being studied.

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The alkaline isopotential point of the bacterial cell. Preliminary note.[1]

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Earlier studies on the electrophoretic migration of bacterial cells suggested the probable existence of a second isopotential point in the extreme alkaline range but results were irregular and uncertain.[2] Later work shows that such inconsistencies are due to a phenomenon observed in another connection,[3] the creation through the buffering power of the bacteria of zones of diminished alkalinity in their immediate vicinity. This effect

[1] Studies here reported were aided by a grant from the Loomis Research Fund of the Yale School of Medicine.

[2] Winslow, C.-E. A., Falk, I. S., and Caulfield, M. F., *J. Gen. Physiol.*, 1923, vi, 177.

can be eliminated by shaking the suspension vigorously for five minutes before placing it in the electrophoretic cell.

Observations made in this way, and with electrometric determination of pH,[4] show that there is a very definite alkaline isopotential point close to pH 13.5,—that for *B. cereus* lying at about 13.3 to 13.4 and that for *Bact. coli* at 13.6 to 13.8. Above this isopotential point the cells acquire a positive charge which increases rapidly to very high values with further increase in alkalinity.

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The buffer mechanism for the calcion concentration and the determination of calcion buffer values.

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The calcion concentration of aqueous systems is regulated by calcion buffers. They are electrolytes which resist the change in calcion concentration upon addition or removal of calcium salts. The calcion concentration is stabilized in the presence of mixtures of weak acids and their salts which react to form insoluble normal calcium salts and soluble intermediate calcium salts.

The carbonates as calcium buffers may be expressed by the buffering reactions:

$$\left.\begin{array}{c} CaCl_2 \rightleftharpoons Ca^{++} \\ + \\ 2\ NaHCO_3 \rightleftharpoons 2\ HCO_3^- \end{array}\right\} \rightleftharpoons Ca(HCO_3)_2 \rightleftharpoons \left\{\begin{array}{c} CaCO_3 \\ + \\ H_2CO_3 \end{array}\right.$$

The phosphates as calcium buffers may be similarly expressed:

$$\left.\begin{array}{c} 4\ CaCl_2 \rightleftharpoons 4\ Ca^{++} \\ 4\ Na_2HPO_4 \rightleftharpoons 4\ HPO_4 \end{array}\right\} \rightleftharpoons 4\ CaHPO_4 \rightleftharpoons \left\{\begin{array}{c} Ca_3\ (PO_4)_2 \\ + \\ Ca\ (H_2PO_4)_2 \end{array}\right.$$

[3] Winslow, C.-E. A., and Falk, I. S., *J. Bact.*, 1923, viii, 215.

[4] Falk, I. S., and Shaughnessy, H. J., PROC. SOC. EXP. BIOL. AND MED., 1923, xx, 426.