(5) More economical utilization of the calories of food consumed (as well as of the body material of the mother) in the rearing of the young to weaning age.

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Some phases of the disinfection theory.

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Bact. typhosum and *Bact. coli* (*communis*) were suspended in distilled water, tap water, and M/500 buffer solutions, respectively, at constant temperature levels (0°, 10°, 20°, 30° C.); and the numbers of survivors were determined by means of decimal dilutions upon agar plates. The conditions imposed (moderate H-ion concentrations at moderate temperatures) permitted a closer study of the disinfection process than has been usually possible.

It was found, of course, that *coli* was relatively more resistant than *typhosum*, but this greater resistance (at P_H 3.5) decreased as the temperature level rose. At 0° C., *coli* was 67 times more resistant, and at 30° C. it was only 8 times more resistant than *typhosum*. There was a high inconstancy in results between duplicate tests carried out in tap or distilled water. This inconstancy could at times be correlated with comparatively insignificant fluctuations in P_H of the water. When very dilute (M/500) Clark and Lubs buffers were used, this variability disappeared very largely.

At 20° C., *Bact. typhosum* possesses the greatest tolerance within a narrow zone delimited by P_H 5.0 and 6.4. A slight increase in acidity beyond the zone results in conditions of maximum mortality. For *Bact. coli* the zone is wider and centered about neutrality. Cohen and Clark[1] found that the P_H optima for growth and fermentation of bacteria may be different. It is now found that the optimum for tolerance may also be distinct.

The logarithmic decline in numbers of bacteria may be modified by suitably chosen conditions. This applies also to some monomolecular chemical reactions. The logarithmic course in either case is merely a statistical integration and gives no information

[1] Cohen, B., and Clark, W. M., *Jour. Bact.*, 1919, iv, 409.

as to the mechanism of chemical decomposition or of bacterial disinfection. They both illustrate the operation of the law of mass action.

The extended report of these experiments will be published soon in the *Journal of Bacteriology.*

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A modified Hellige colorimeter for the comparison of solutions containing two colors.

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By introducing an additional standard wedge in the Hellige colorimeter it has been found possible to greatly extend the usefulness of this instrument. With the instrument thus modified, the determination of the hydrogen ion concentration may be very quickly and accurately made by the colorimetric method, since with the two wedges it is possible to obtain all the shades of color from the acid to the alkaline side of the indicator. To aid in reading, the instrument has been provided with an eyepiece with lens.

With the aid of Sørensen's phosphate solutions (standards of P_H 5.2 and 7.4 for brom cresol purple and standards of P_H 6.4 and 8.4 for phenol red) it is possible to cover the range of P_H 5.3 to 8.3 with an accuracy in reading of $\pm$ P_H 0.02 to 0.04. This covers the most used range in the determination of the hydrogen ion concentration of urine, blood and bacteriological culture media. The phenol red standards also serve excellently for the Marriott alveolar carbon dioxide test.

It is a matter of common observation that it is rarely possible to obtain an exact color match with the standard in the phenol-sulphonephthalein renal function test. By using the acid (yellow) phenol red standard in conjunction with the 'phthalein standard it is always possible to obtain an exact color match. If desired correction may be made for the rather small error introduced by the "off" color.