the amount of one vitamine did not have any effect, the addition of the missing component in both of the above cases caused a prompt resumption of growth. The rats given both B and D from the start together with the last filtrate, which contains neither B nor D, showed a normal behavior both in regard to growth and appearance. The influence of the last filtrate does not seem to be very important but has to be investigated.

The results suggest that the rats and possibly other mammals require, besides the vitamine A, at least two vitamines of the B type, namely the B and D vitamine, for their well-being and growth.

8 (1755)

Comparative buffering value of American peptones.

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Some time ago one of us[1] reported before this Society the results of the inquiry into the effect of the composition of the medium as affecting the reliability of the cultural methods of identification of bacteria, and has particularly insisted on the rôle of the buffer and on necessity of quantitative adjustment of media in respect to its buffer content.

In the present investigation we have attempted to determine the buffer content of a few of the commercial peptones with the view of determining the limits of possible variation in the buffer content in the media prepared in different laboratories as due to the choice of peptone alone. The method used was that of determining electrometrically the hydrogen ion concentration of the various peptone solutions before and after the addition to them of measured amounts of acid and alkali respectively. The study demonstrated the fact that initial reaction of different peptones varies within fairly broad limits, that due to complexity of composition the buffering action of any given peptone varies at different zones of hydrogen ion concentration, and that buffering action of one peptone at a given hydrogen ion concentration may

[1] Bronfenbrenner and Schlesinger, PROC. SOC. EXP. BIOL. AND MED., 1918, xvi, 44.

exhibit as much as five times more buffering action than another peptone at the same hydrogen ion concentration. In general, the peptones tested showed the highest degree of variation in buffering effect in the zone of the hydrogen ion concentration limited between $P_H = 9$ and $P_H = 8$, and the lowest degree of variation in the zone between $P_H = 4$ and $P_H = 5$. As to the absolute concentration of buffering salts, these were found in most peptones to be the highest at the zone of the lowest concentration of the hydrogen ions and not in the zone of neutrality or of high hydrogen ion concentration where the buffering action would be most desirable for the use in media for identification of bacteria.

Below is a table showing the relative buffering action of peptones at various P_H levels.

Peptone.	PH 9–8.	PH 8–7.	PH 7–6.	PH 6–5.	PH 5–4.
Difco	9	5	3.5	5	11
Proteose	11	8	4	5	15
Witte	6	6	5	4.5	10
Aminoid	34	11	7	6	14
Fairchild	12	8	9	7	14
Roche	13	8	5	4	10
Armour	20	11	9	7	12

This work is a part of the investigation of food poisoning, conducted under the direction of Dr. M. J. Rosenau, Professor of Preventive Medicine and Hygiene, Medical School of Harvard University. The investigations are made under the auspices of the Advisory Committee on the Toxicity of Preserved Foods of the National Research Council, and under a grant of the National Canners' Association.

9 (1756)

Some mathematical relations in the Wassermann reaction.

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Von Krogh's[1] equation, $y = x^n/(x^n + k)$, has not received the the consideration by immunologists which its very close statement of the facts in several immune mechanisms capable of numerical

[1] Von Krogh, *Journal of Infectious Diseases*, 1916, xix, 452.