considered a substance of our food which reduces gastric secretion from the stomach, and more so from the duodenum and the small intestine. Possibly the depressing effect of fat upon gastric secretion, as discovered by Pawlow, resolves itself into the mere effect of its division product, glycerin.

Aside from glycerin, there are two other kinds of alcohol, namely, amyl and butyl alcohol, that I have observed to have an inhibitory effect upon gastric secretion.

23 (433)

The summation of stimuli.

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The phrase, "summation of stimuli," has been employed at times to signify only the phenomenon in which a stimulus of a fixed intensity, which at first is too weak to stimulate living substance, will upon repetition be followed by a response. It is more rational to include within the concept all cases of summation, whether the stimulus is at first below the stimulation threshold or above it. Summation is usually ascribed to an increase in the irritability of the protoplasm, but the conditions responsible for such increase have not been known. Two years ago, the senior author explained the increase in irritability found in the treppe of muscle, by the augmenting action of fatigue substances, notably carbon dioxide and lactic acid. This chemical theory of the treppe is here applied to the explanation of summation in general. The validity of this explanation has been confirmed by a large variety of experiments performed on the muscles of medusæ and crustaceans. It has long been known that summation with subminimal stimuli is very readily obtained in these forms. The authors have confirmed this. They have also studied the action on the muscles of carbon dioxide and lactic acid in small quantities. When a stimulus was found that was just too weak to cause contraction, carbon dioxide was administered to the muscle for a period of a few seconds, either in solution or as a gas. The hitherto subminimal stimulus was then

found to be supraminimal and at times even maximal. A similar result was obtained with lactic acid, which was administered to the muscle in an isotonic solution of various salts. When lactic acid in a strength of 1/3200, or even 1/6400, gram-molecular solution, was injected into the muscle, a stimulus heretofore subminimal immediately elicited contractions. Thus both carbon dioxide and lactic acid in small quantity are capable of increasing the irritability of protoplasm. Gotschlich found that continued subminimal stimulation of muscle renders it acid in reaction, even though no contractions occurred. The conclusion therefore seems to be justified that summation of stimuli may be explained as due to a rise in irritability, brought about by the action on the living substance of small quantities of certain products of metabolism, especially carbon dioxide and lactic acid, the same substances which, in larger quantity, are important factors in fatigue.

24 (434)

The action of magnesium salts: A. In relation to motor nerve impulses; B. In relation to sensory stimulation.

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Since 1869 it has been generally held that magnesium salts have a curare-like action (Jolyet and Cahours, *Arch. de physiol.*, 1869, ii, 113; Binet, *Rev. méd. de la Suisse romande*, 1892, xii, 523, 593; Wiki, *Jour. de physiol. et de path. gén.*, 1906, viii, 794–803; Bardier, *ibid.*, 1907, ix, 611, and others). As this point is of interest in connection with the behavior of animals after the subcutaneous injection of magnesium salts, we have re-investigated this phase of their action.

A. In Relation to Motor Nerve Impulses.

Frogs have for the most part been used, though some observations have been made on mammals (rabbits, dogs, cats, rats, etc.). As the results are in agreement for all animals so far tried, only those on frogs and rabbits will be mentioned here.