

by the fact that, although carbo-hydrates of normal reaction leave the stomach very soon after ingestion, yet, when moistened with one per cent. solution of sodium carbonate, depart slowly after the manner of proteids. This conclusion seems almost indisputable. However, it is probable there are other stimuli of pyloric relaxation. It seems to me very probable that the peristalsis of the stomach, particularly of the pyloric region, takes some part in the mechanism of the pyloric sphincter, for gastric peristalsis and propulsion of food into the intestine takes place in the absence of free hydrochloric acid, as in the case of hypochylia.

The stimulus of pyloric contraction is better known. All physiologists, I believe, are agreed that acid in the duodenum is the agent. Its presence not only closes the pylorus, but keeps it closed until the reaction of the duodenal contents is neutral. Then the sphincter again relaxes and the pyloric cycle begins anew.

In addition to closing the sphincter, the acid chyme in the duodenum stimulates the secretion of the pancreatic juice, and to a much less extent the bile. The increase of these alkaline secretions hastens the neutralization of the gastric acid, and lessens the period of pyloric contraction. With regard to the manner in which the acid chyme stimulates the secretion of pancreatic juice, Pawlow held that the acid acted in a reflex manner on the pancreas. However, Bayliss and Stirling have shown that the stimulus of the pancreas is a substance which they have called secretin, produced by the action of the acid of the gastric juice on the mucosa of the duodenum.

*Etiology.*—In gastric diseases spasm of the pylorus is a very common condition. It may be either primary or secondary, usually the latter.

The primary spasm generally occurs in neurotics, and is occasioned by shock, injury, worry, or by dietetic indiscretion, such as the ingestion of too hot or too cold, or highly irritating food. If peristalsis, such as occurs during digestion, is a factor in the opening of the pylorus, then spasm or diminished relaxation of the sphincter would be necessary results in all gastric affections in which the musculature of the body of the organ is weakened. This is a probable explanation of the attacks of pyloric spasm, which occasionally occur in patients convalescing from infectious diseases, such as typhoid fever.

Secondary spasm of the pylorus is a common occurrence. It is observed in myasthenia gastrica, in ulcer, in hypochlorhydria,