TABLE III.

Artificial Respiration with Oxygen Alone.

No.	Lived.	No.	Controls Lived.
72	+	78	+
73	+	79	3 minutes.
74	+	80	2 "
75	+	81	4 "
76	60 minutes.	82	4 "
77	+	83	3 "
84	+	89	4 "
86	35 minutes.	93	5 "
87	28 "	94	4 "
88	8 "	95	3 "
90	+	96	9 "
91	105 minutes.	97	5 "
92	31 "	99	3 "
98	64 "	101	+
100	93 "	103	+
102	16 "	104	2 minutes.
	7 out of 16 lived.		3 out of 16 lived.

TABLE IV.

Artificial Respiration with Oxygen Accompanied by Injections of Epinephrin and Chloralhydrate-Urethane Solutions.

No.	Lived.	No.	Controls Lived.
138	+	146	5 minutes.
141	+	147	4 "
142	+	148	5 "
144	+	149	3 "
154	+	152	+
157	+	156	5 minutes.
160	37 minutes.	167	+
163	+	168	4 minutes.
170	14 minutes.	169	4 "
172	+	171	5 "
174	51 minutes.	173	4 "
176	98 "	175	6 "
		177	4 "
	8 out of 12 lived.		2 out of 13 lived.

22 (432)

The influence of glycerin on gastric secretion.

By **L. KAST.**

[*From the Medical Department, New York Post-Graduate Medical School.*]

If the gastric mucosa of the living dog is exposed for a short time to from one to two per cent. of glycerin in water, the gastric secretion which follows is not more intense than after water

alone. Three years ago I observed this experimentally in the Laboratory of the Pathological Institute of Berlin, and last year it was confirmed by Rodari. In experiments with stronger concentrations of glycerin, especially if allowed to enter the duodenum, the gastric secretion which follows is less than after pure water. Glycerin furthermore not only reduces the gastric secretion incited by water, but inhibits even a subsequent secretion of the stomach provoked by sham-feeding. This I have observed in an experiment on a dog with sham-feeding; the influence of glycerin on the human stomach does not appear to have been the subject of study.

Up to the present I have examined the influence of glycerin on gastric secretion in twenty-one patients, some of whom suffered from gastric disturbances, some from other affections, and from this material I have collected the results of seventy-two experiments. The patient received a simple test breakfast, and subsequently, under otherwise identical conditions, a similar test breakfast with the addition of from 30 to 45 cubic centimeters of glycerin. The two test meals were administered either on the same day or on different days, and when the former method was employed, at least four examinations were made; one day the simple test meal was given first and the other day the glycerin test meal was given first. Of these twenty-one patients sixteen showed a diminished total acidity after glycerin of from 3 to 50 per cent. of their acidity; in four patients the results were irregular; and in one patient there was only an increased secretion of hydrochloric acid after the ingestion of glycerin.

It may, therefore, be assumed that glycerin reduces gastric secretion in the majority of cases, and this was especially noticeable in cases with subjective or objective signs of hyperacidity.

Pawlow has demonstrated that neutral fat reduces both the motility and the secretion of the stomach. Possibly neutral fat, as such, does inhibit the secretion, but it is also possible that a cleavage product of the fat may have the same effect. If such is the case — and it has been shown that the stomach splits fat into fatty acids and glycerin to some extent — then the glycerin component is the inhibiting factor, because, according to Pawlow, soaps and fatty acids excite the gastric secretion from the duodenum. Should my experiments be confirmed glycerin would have to be

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.

By **FREDERIC S. LEE** and **MAX MORSE.**

[*From the Department of Physiology of Columbia University at the College of Physicians and Surgeons, New York, and from the Harpswell Laboratory.*]

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