

ondary sodium phosphate markedly increases the anesthetic efficiency of procaine hydrochloride. Sollmann<sup>4</sup> corroborated and extended these findings. Regnier,<sup>5</sup> from his results on alkalinization of cocaine hydrochloride solutions, also concluded that increase in alkalinity augments anesthetic properties.

The present work consisted in a comparison of the anesthetic efficiency of procaine borate and procaine hydrochloride solution at varying hydrogen ion concentrations by the method of Adams<sup>6</sup> on goldfish with modifications suggested by Dailey<sup>7</sup> and Benedict. The solutions used were brought to the desired pH with N/10 sodium hydroxide and N/10 hydrochloric acid. The pH determinations were made with a Leeds-Northrup Quinhydrone potentiometer. All solutions used were of the same concentration with respect to the anesthetic base, the procaine hydrochloride solutions containing 1 gm. of the hydrochloride in 500 cc. of solution and the procaine borate solutions containing 1.638 gm. of the borate in 500 cc. of solution.

The results obtained are given in the graph. Each point represents the average time required to anesthetize 3 or more fish, anesthesia being determined by lack of response to stimulation of fins or tail. As can be seen by the curves the efficiency as determined by the time for anesthesia varies for both solutions and at a given pH is approximately the same for each drug. Apparently the increased efficiency of procaine borate is due to its alkalinity. Observations on the anesthetic effect of the 2 solutions on the rabbit's cornea confirm these findings on the goldfish.

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### Effect of Diet on the Healing of Experimental Gastric Ulcer.

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Ferguson<sup>1</sup> was able to produce uniformly in rabbits gastric ulcers which persisted from 2 to 8 months or longer. He incised the an-

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<sup>4</sup> Sollmann, *J. Pharm. Exp. Therap.*, 1917, x, 379; *J. Am. Med. Assn.*, 1928, lxx, 216.

<sup>5</sup> Regnier, *Compt. rend. de biol.*, 1925, xcii, 605.

<sup>6</sup> Adams, Rideal, Burnett, Jenkins, Dreger, *J. Am. Chem. Soc.*, 1926, xlvi, 1758.

<sup>7</sup> Dailey and Benedict, *Dental Cosmos*, 1929, lxxi, 704.

<sup>1</sup> Ferguson, *Am. J. Anat.*, 1928, xlii, 403.

terior wall of the stomach and at the point of incision removed a piece of mucosa and then closed the stomach by a silk suture, the rabbits being kept on a diet of hay, oats and carrots. It occurred to us that this observation provided a method of studying the effect of diet on the healing of this experimental gastric ulcer.

In our first series of rabbits we found that if a lesion was made in the posterior wall of the stomach in which no silk suture was present and one in the anterior wall in which a silk suture was present and the rabbits placed on the stock diet of hay, oats and carrots, that the posterior lesion healed in 30 days, but the anterior lesion did not. This showed that the silk suture was a factor in delaying healing and that in the absence of the silk, diet played no rôle in delaying healing.

Anterior lesions of the Ferguson type were made in 29 rabbits. Twelve were placed on the stock diet and 17 on a diet of milk, bread and mashed boiled carrots. The rabbits were sacrificed on the 30th day. All of the 12 rabbits on the "rough diet" had ulcers at the 30th day. Only 3 of the 17 on the "soft diet" had ulcers. The results show that the silk suture *per se* is not sufficient to prevent the ulcer from healing and that a "rough diet" plus the silk suture factor are sufficient to produce a chronic gastric ulcer, grossly and histologically, and that a "soft diet" favors the healing of gastric lesions.

The same results were obtained in a series of 4 rabbits on a "rough diet" in which a gut suture was used instead of silk.

In another series of 4 rabbits which were kept on a diet of dry "quick rolled oats" with a fiber content of only 1.4%, the ulcers failed to heal. On opening the stomachs of the animals, the contents were found to be as pasty and dry as that found on the "rough diet." This indicates that the fluidity of the gastric contents is also a factor determining the healing of gastric lesions.

Experiments are under way to test further the fluidity factor as well as fat and food-buffer factors.