actually increased during the renin administration (39% increase) although he died of uremia on the 74th day of treatment.

Following the prolonged administration of purified renin, the plasma of Dogs 13, 28, and 30 likewise showed no appreciable change in ability to neutralize the acute pressor effect of renin when refrigerated with it (Table II).

Discussion and Summary. The inability of prolonged administration of purified renin to change materially the blood pressure of the 3 hypertensive dogs reported herein does not necessarily refute the findings of Wakerlin, for he used a crude preparation of renin, and the reductions in pressure in his hypertensive dogs may have been due to some other factor present in his kidney extracts. The present observations indicate, however, that the prolonged administration of purified renin neither reduces the blood pressure of hypertensive dogs nor endows their plasma with the ability to inhibit the vasopressor response of renin.

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A Simplified Procedure for Preparing an Improved Pavlov Pouch.

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The classical operation for preparing an innervated pouch ("Pavlov Pouch") of a portion of the stomach[1, 2] is difficult and time-consuming and there is some doubt whether the pouch retains its full vagus innervation.[3] Modifications have been suggested which were designed to simplify the technic[4, 5] or to preserve a larger proportion of the nerve supply.[5-8] However, with one exception[8]

1 Pavlov, I. P., *Ergebn. d. Physiol.*, 1902, **1**, 246.

2 Pavlov, I. P., *The Work of the Digestive Glands*, 2nd ed., London, 1910.

3 Jemerin, Edw. E., and Hollander, Franklin, PROC. SOC. EXP. BIOL. AND MED., 1938, **38**, 139.

4 Boldyreff, W. N., *Bull. Battle Creek Sanit. and Hosp. Clinic*, 1925, **20**, 206.

5 Neuwelt, F., Olson, W. H., and Necheles, H., PROC. SOC. EXP. BIOL. AND MED., 1940, **44**, 74.

6 Hollander, Franklin, and Jemerin, Edw. E., *Ibid.*, 1938, **39**, 87.

7 Cope, O., McMahon, C. E., Hagströmer, A., and Thompson, R. H., *Arch. Surg.*, 1940, **40**, 717.

8 Avrorov, P. P., and Schpuga, G. M., *Kub. Nauch. Medicin. Vestnic.*, 1940, **12-13**, 238.

no procedure has been described which does not involve the complete separation of a part of the wall of the pouch from that of the main stomach with the consequent risk of severance of at least some of the nerve fibers.

The operation to be described leaves intact the entire muscular wall connecting the pouch with the main stomach. This has the double advantage of preserving the entire nerve supply and of avoiding the necessity of severing any of the larger blood vessels. Because no time is lost controlling hemorrhage, the operation can be performed more quickly, and therefore with less shock to the animal than the classical operation. This method exclusively has been used in our laboratory for the past several years with excellent results.

The general plan of the operation involves turning a portion of the stomach inside out through a small incision, thus making the mucosa accessible for the building of a mucosal wall between the projected pouch and the main stomach.

Detailed Procedure. The special instruments required are 2 pairs of vulsellum forceps and a set of gastroenterostomy forceps with 3 blades. The fundic portion of the stomach is delivered through an abdominal incision in the usual manner and the site of the pouch selected. An incision about two centimeters long is made in the center of the pouch area, through the entire gastric wall including the mucosa. This incision should be made parallel to the direction of the vagus fibers (see Jemerin and Hollander[7]), and not as indicated in the illustration.

Two pairs of vulsellum forceps are inserted through the gastric incision and the gastric wall grasped from the inside at the two points destined to be the extremities of the pouch (Fig. 1, A). By means of traction on the forceps and manipulation the entire pouch area is turned inside out through the incision.

One is now presented with a more or less circular rosette of mucosa with the vulsellum forceps attached to opposite points on its circumference. Further traction on the forceps, in opposite directions, pulls the circular rosette into an oblong shape so that two roughly parallel ridges of mucosa appear stretched between the forceps (Fig. 1, B).

The gastroenterostomy forceps are now applied so that the center jaw lies between the ridges of mucosa with its tip near the attachment of one pair of vulsellum forceps and as great a length as possible of each mucosal ridge is grasped between the center jaw and the corresponding outer jaw (Fig. 1, C). Even a large pair of forceps will be too small to encompass the whole distance between the pairs of vulsellum forceps. For this reason, when the procedures

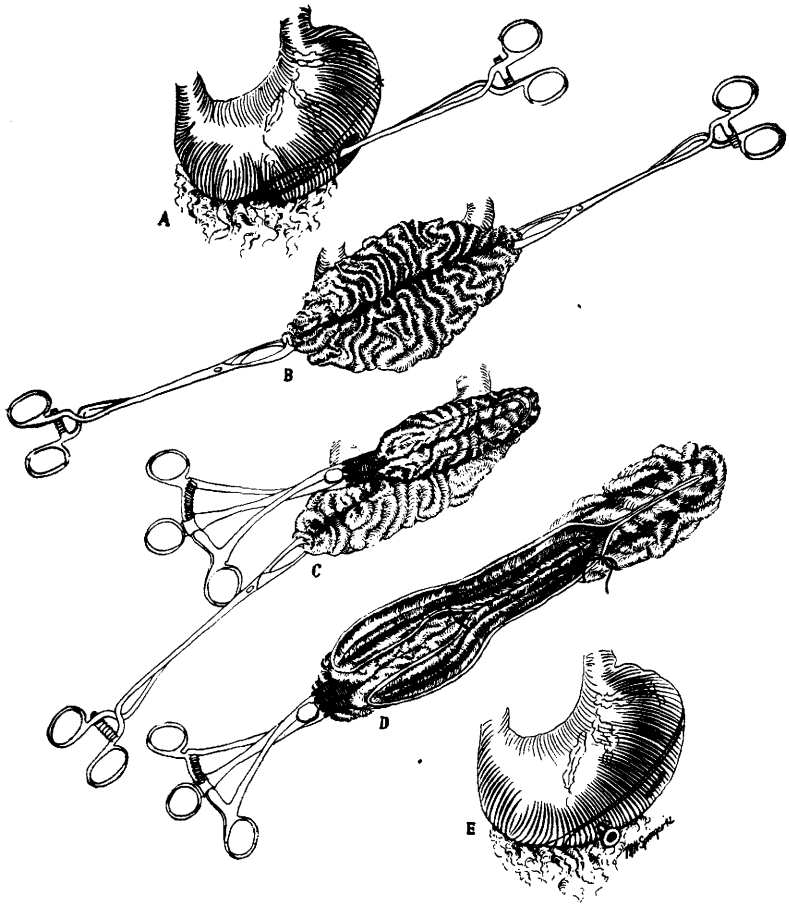

FIG. 1.

Various Stages of the Operation Described in the Text.

A. Vulsellum forceps attached to the gastric wall from the inside of the stomach preparatory to turning the pouch area inside out. A second pair of forceps (not illustrated) is attached at the upper end ("X") of the pouch area.

B. Appearance after turning the pouch area inside out. The darkly shaded region is the gastric lumen.

C. First position of the 3 bladed forceps. The upper end of the mucosal incision has been made and is to be continued along the dotted lines.

D. Diagrammatic representation of several steps showing the inner and outer suture lines and, at the lower left end, the mucosal flaps prepared for suturing.

E. The stomach with completed pouch. Better alignment of the cannula with the lumen of the pouch is obtained if the pouch runs somewhat from front to back rather than along the greater curvature as illustrated.

described below are completed in one area the gastroenterostomy forceps are shifted to the next adjacent area and so on until the entire distance has been covered. With the G.E. forceps in position a hairpin shaped incision is made through the mucosa only, extending along the crest of each ridge of mucosa and around the end where the

vulsellum forceps, which are now removed, were attached (Fig. 1, C). This incision is eventually to be extended so as to encircle the pouch area but at the moment is continued only to the point where the ridges of mucosa disappear between the blades of the gastroenterostomy forceps.

The next steps are illustrated by the composite diagram, Fig. 1, D. The mucosa along each side of the incision with some of the submucosa is dissected away from the remainder of the gastric wall, forming mucosal flaps about 1 cm in width (D, lower left end). The two inner flaps of mucosa are sutured together in such a way as to approximate the submucosal surfaces and turn the edges in toward the main stomach (D, midportion). The outer flaps are sutured in like manner but with the edges turned outward (D, upper right end). The suture lines are continued as far as possible, the inner a little farther than the outer, and the forceps are then shifted toward the other end of the pouch. The incisions and suture lines are continued as before, shifting the forceps whenever necessary until the suture lines are within a few centimeters of the second pair of vulsellum forceps which are still attached to the mucosa.

All the forceps are now removed and the incisions and suture lines continued until they meet where the ridges of mucosa join at the end of the pouch.

A double mucosal wall has been constructed between the pouch and the main stomach. The pouch is now turned right side out and the original small gastric incision closed with a double row of sutures. A hard rubber cannula is installed at one end of the pouch (Fig. 1, E) at the point judged to be the most dependent when the animal is in the upright position.* After the stomach has been returned to its natural position in the abdominal cavity the outer end of the cannula is brought out through a stab wound in the abdominal wall, so located as to cause the least displacement of the stomach. A soft rubber drain tube is inserted into the pouch *via* the cannula and held in place by means of a thread passed through small diametrical holes drilled through the cannula near its outer end.

From this point on the procedure, including after care, is the same as after any gastric operation. Dry food such as dog biscuit or dog "chow" is particularly to be avoided because it tends to cause rupture of the mucosal wall between the main stomach and the pouch.

* Dr. M. H. F. Friedman prefers to insert the cannula through the original gastric incision, in which case the incision should be made near one end rather than in the center of the pouch area.