the effect of infection on the thyroid and would not substantiate the view that increased basal metabolic rate after injury to the adrenals was the result of hyperactivity of the thyroid gland. I am not aware that any former observers have removed a piece of the thyroid at a preliminary operation in their animals to compare subsequent sections with. It is easily conceivable that the appearances which they observed were not changes from the original state of the thyroid but were present before the experiment began. The results of my experiments seem to show that definite evidence of hyperplasia in the thyroid does not follow the introduction of infection in animals or injury of the adrenal glands by freezing or crushing.

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Ulceration in Digestive Tract Following Experimental Lesions in Brain-Stem.*

A. D. KELLER, W. K. HARE AND M. C. D'AMOUR.

From the Department of Physiology and Pharmacology, University of Alabama School of Medicine.

The relation of gastro-intestinal ulceration to lesions of the central nervous system has been reviewed by Cushing[1] and Light.[2]

In our series of 50 cats and 40 dogs having experimental lesions in the upper brain-stem, acute gastro-intestinal changes have occurred in a relatively small number. The other animals have exhibited normal guts or slight changes that are difficult to evaluate. Lesions have varied considerably in extent and location. Apart from 3 chronic mid-brain cats in which erosions were found in the stomach, the changes have followed lesions accompanied by hemorrhage into the ventricles or transverse lesions at the level of the chiasm unassociated with intraventricular hemorrhage. This report is confined to a description of maximum reactions noted.

Hyperemia and Hemorrhage. Marked hyperemia of the stomach has been encountered in 12 dogs at death—7 to 24 hours after operation—confined in most instances to the body (Fig. 1). Associated

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[1] Cushing, H., *Surg. Gynec. and Obstet.*, 1932, **55**, 1.

[2] Light, *J. Pharm. and Exp. Ther.*, 1932, **45**, 227.

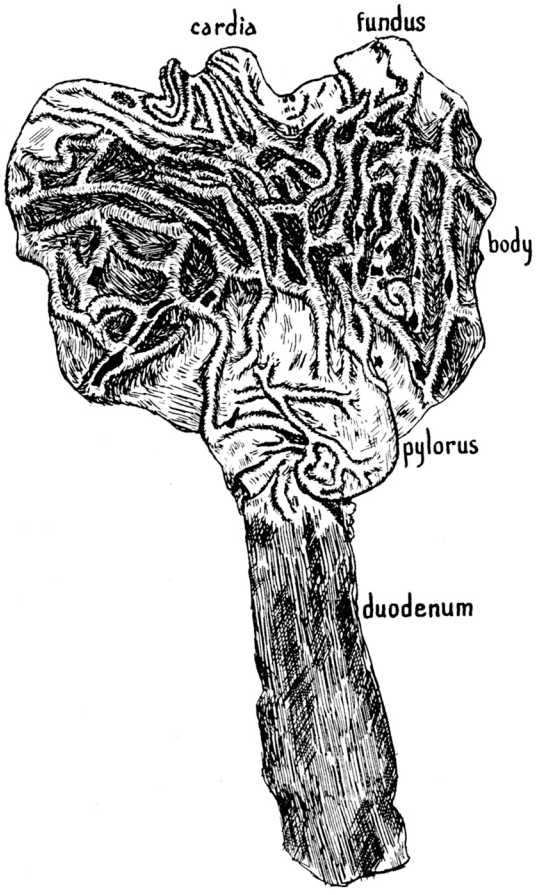

FIG. 1.

with the hyperemia were multiple hemorrhagic spots in the mucosa, marked by attached clots. The hemorrhages occurred most frequently on the crests of the mucosal folds. Blood in the lumen varied from a slight staining of the mucus to large free clots.

Associated with this reaction in the stomach was a remarkable generalized hyperemia of the mucosa of the duodenum. The hyperemia was progressively less marked going distally, until at the upper end of the jejunum it again became more pronounced, fading as the distal ileum was approached. The intestinal content varied from bloody mucus to blood only. (From the small bowel of Dog 27, 50 cc. of practically pure blood was collected at autopsy; blood was the chief constituent of antimortem feces.) In the large bowel hyperemia was confined to crests of longitudinal folds and in cases amounted to frank hemorrhage.

Erosions. Multiple erosions in the stomach were encountered in 8 dogs at death—24 to 60 hours after operation—and in 3 cats at death—1, 2, and 7 weeks after operation. They occurred most frequently on the anterior and posterior surfaces of the body, just proximal to the pylorus, being more numerous on the crests of the folds (Fig. 1). Infrequently erosions occurred in the pylorus and proximal duodenum. Only in 2 instances were the erosions associated with hyperemia and hemorrhage.

Both hemorrhages and erosions have occurred in animals in which there was no vomiting and no hyperthermia.

Enhanced appetite has occurred in animals having relatively small lesions in the hypothalamus. A half-grown kitten consumed 600-700 cc. milk in an 8-hour period, whereas the *maximum* intake of unoperated kittens has been 300-400 cc. The increased intake is not due to thirst since the water intake was only 10 to 50 cc. per day when food was withheld. A few of these animals exhibited spontaneous vomiting which was relieved by food. In 2 cases vomiting was precipitated on occasions by withholding food and then relieved by feeding. (These animals had normal blood sugars; however, in several of the dogs there was a progressive fall in blood sugar to below normal.)

Impaired digestion was manifested in several cats with the hypothalamus severed from the rest of the brain-stem and in one low mid-brain preparation by the presence of undigested meat (no evidence of beginning digestion) in the stomach at autopsy 24 to 72 hours after feeding, and by the appearance of undigested meat in the feces 36 to 72 hours after feeding. No gross pathological changes were observed in these cases.

Cardio-vascular disturbances encountered are: Irregular pulse with forceful beats; immediate ventricular fibrillation when needle was introduced for blood (3 instances); and the finding of large fibrinous clots in the chambers of the heart—right and left—and large vessels. (One of the most marked was a dog with no brain lesion in which blood was injected into the ventricles through the corpus callosum.) In addition fibrinous non-occluding plugs were found in the smaller vessels of the liver, lungs, and stomach.

Our data at present do not allow conclusions as to localization of mechanisms concerned or the manner in which they act; however, we believe that hemorrhage into the ventricles as well as lesions in the anterior hypothalamus unassociated with intraventricular clots

are significant, particularly in the light of the work of Beattie,[3, 4] Cushing,[5] Light,[2] and Ferguson.[6]

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Increased Potency of Liver Extract by Incubation with Human Gastric Juice.*

O. M. HELMER, PAUL J. FOUTS AND L. G. ZERFAS.
(Introduced by G. H. A. Clowes.)

From the Lilly Laboratory for Clinical Research, Indianapolis City Hospital, and the Department of Medicine, Indiana University School of Medicine.

Following the work of Castle and his associates,[1] Reimann[2] reported a marked increase in the potency of liver by its digestion in normal human gastric juice. Walden and Clowes,[3] independent of Reimann, obtained a very active preparation by the incubation of liver and liver extracts with small amounts of hog gastric tissues. However, Barnett and Thebaut[4] were apparently unable to increase the activity of liver by its digestion with normal human gastric juice.

The purpose of this paper is to report the results obtained by this laboratory when patients with pernicious anemia in relapse were fed daily a subminimal dose of liver extract No. 343 (that derived from 100 gm. of liver) which had previously been incubated at 40°C. for 4 hours with 100 cc. of normal human gastric juice obtained after histamine stimulation. During the control and test periods the diets

[3] Beattie, *Proc. Royal Soc.*, 1930, B, **106.**

[4] Beattie, *Can. Med. Assn. J.*, 1932, **26**, 278.

[5] Cushing, *Proc. Nat. Acad. Science*, 1931, **17.**

[6] Ferguson, PROC. SOC. EXP. BIOL. AND MED., 1932, **30**, 328.

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[1] Castle, W. B., *Am. J. Med. Sci.*, 1929, **178**, 748. Castle, W. B., and Townsend, W. C., *Am. J. Med. Sci.*, 1929, **178**, 764. Castle, W. B., Townsend, W. C., and Heath, C. W., *Am. J. Med. Sci.*, 1930, **180**, 305. Castle, W. B., Heath, C. W., and Strauss, M. B., *Am. J. Med. Sci.*, 1931, **182**, 741. Strauss, M. B., and Castle, W. B., *New Eng. J. Med.*, 1932, **207**, 55

[2] Reimann, F., *Med. Klin.*, 1931, **27**, 880.

[3] Walden, G. B., and Clowes, G. H. A., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 873.

[4] Barnett, C. W., and Thebaut, W. M., *J. Am. Med. Assn.*, 1932, **99**, 556.