These animals had, in addition to the gastric fistula, a caecal fistula.[2] *B. prodigiosus* was suspended in water and the various bile solutions and the relative concentration in the caecum was determined. This method has been used to determine the relative bacterial killing power of the intestinal tract.[2] These test microorganisms appeared only in 15 to 20% of their original concentration in the caecum for about 2 hours (1½ to 3½ hours after feeding) when given in distilled water. In 1% bile they appear in the caecum within 30 minutes and last for 6 hours and are in the same concentration as was placed in the stomach. There is no evidence of a bacterial killing action in the passage from the stomach to the caecum. This concentration of bile is below the diarrhea dose. The test bacteria can be cultured from the gastric contents so long as there is an acid-deficit in the stomach. Higher concentrations of bile that produce vomiting and diarrhea are associated with an interference with the bactericidal power of the intestinal tract, but the period is shorter in duration. This is probably due to the gastric acid secretion that follows these stimulating doses of larger quantities of bile. One gram of dried bile in 100 cc. of water leaves the post-digestive dog's stomach rapidly and is followed by a period of achlorhydria. This causes a change in the normal reaction of the small intestine by allowing alkaline buffered solution to pass into the duodenum and is associated with an interference with the normal bacterial killing power of the small intestine. This is a preliminary report upon the problem of immunization by oral administration of the vaccine.

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Further Observations on Mammillo-infundibular Region of Diencephalon: Relation to Epilepsy, Dementia and the Psychoses.

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In a recent report by Morgan and Johnson[1] it was shown that a lesion in the mammillo-infundibular region of the brain in dogs was followed by symptoms which were in all essential respects identical with epilepsy in the human. The author[2] has reported on a study of

[1] Morgan, Lawrence O., and Johnson, Clarence A., PROC. SOC. EXP. BIOL. AND MED., 1928, xxv, 442.

[2] Morgan, Lawrence O., PROC. SOC. EXP. BIOL. AND MED., 1928, xxv, 444.

4 epileptic brains in which there were marked degenerative changes in the same nuclei which were injured by experimental lesions in the dog (*substantia grisea* of the third ventricle, *nucleus mammillo-infundibularis,* and *nucleus tuberis).*

The epileptic fit as produced experimentally in the dog lasts from 1½ to 3 minutes and is characterized by first tonic and then clonic spasms, unconsciousness, dilation of pupils, salivation, vasoconstriction, increased heart rate, rise in temperature and increased blood pressure. The fits usually commence a few hours after the operation and become more frequent and severe until the animal passes into a condition resembling *status epilepticus.* At this stage the intestines and stomach are dilated, the heart rate increased to 200-250 and the temperature rises to 105-110. In 3 cases clamping off the blood supply to one or sometimes both suprarenals caused an immediate cessation of all symptoms involving the smooth and cardiac musculature and partially inhibited the convulsions which involved the voluntary musculature. Clamping off one or sometimes both thyroids (including parathyroids) stopped the spasms of the voluntary musculature but had no appreciable effect on the remaining symptoms. These animals lived for some time but none of them recovered following the clamping off of the glands.

In one animal which showed the usual symptoms except that the muscular spasms were almost entirely absent the lesion was confined to the *substantia grisea* of the third ventricle with little or no injury to the remaining nuclei. These symptoms disappeared (except the return of consciousness which was only partial) when the left suprarenal was clamped off.

I wish to report an additional case of epilepsy in which the mammillo-infundibular region of the brain shows the same changes previously described.

Human brains have been examined in one case of katatonia dementia precox, one of psychosis with progressive mental deterioration (dementia), and 3 cases of psychosis accompanying cerebral arteriosclerosis. In all of these cases the cells of the *substantia grisea* of the third ventricle are reduced to from 1/3 to 1/2 of the normal number. Many of the remaining cells are chromatolytic and there is some shrinkage and marked proliferation of *glia* in the area occupied by this nucleus. The *nucleus tuberis* shows a varying amount of chromatolysis but no cell destruction.

The data obtained from experimental animals and from a study of pathological human material, although perhaps not sufficient to be conclusive is quite suggestive. The *substantia grisea* of the third ventricle is probably a secretory center for the suprarenal glands and

seems to be concerned in some way with the dementias and psychoses and is probably the particular cell group which is concerned with the mental deterioration common to epilepsy. This nucleus is also concerned with the epileptic fit; especially such symptoms as dilation of the pupil, frothing at the mouth, cardiovascular disturbances and perhaps loss of consciousness through a disturbance of the cerebral blood supply. The nucleus *mammillo-infundibularis* and *nucleus tuberis* are probably secretory centers for the thyroid and parathyroid and are concerned with the muscular spasms characteristic of the epileptic fit and perhaps also in body temperature. There is as yet no indication as to which of these nuclei is a center for the thyroid and which for the parathyroid. It is likewise impossible to say what specific part each gland plays in the symptomatology. The epileptic fit is probably the result of a hyperactivity of the 3 nuclei of the infundibular region due to some strongly irritative agent to which some of the cells gradually succumb.

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Some Aspects of the Pharmacology of Apomorphine Hydrochloride.

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In spite of many chemical and pharmacological studies of apomorphine during the past 50 years, there still seems to be considerable doubt as to whether or not the green coloration which appears in apomorphine solutions is evidence of deterioration or of the formation of a new toxic substance. Guinard,[1] Eggleston and Hatcher[2] found little change pharmacologically in solutions of apomorphine which had become a deep green. Heinekamp,[3] however, believed that such apomorphine solutions were definitely less potent. The United States Pharmacopoeia X, and some text books (*e. g.,* Trendelenburg[4]) recommend that solutions should not be used, especially if green immediately or shortly after the dissolving of the solid drug. Harnack[5] declared that the oxidation with sub-

[1] Guinard, L., cited by R. Magnus, *Handb. d. exper. Pharm.*, II, pt. 1, 440.

[2] Eggleston, C., and Hatcher, R. A., *J. Phar. Exp. Ther.*, 1911-1912, iii, 551.

[3] Heinekamp, W. J. R., *J. Lab. Clin. Med.*, 1922, viii, 165.

[4] Trendelenburg, P., *Grundl. d. allg. u. spez. Arzneiverordnung*, Leipzig, 1926.

[5] Harnack, E., *Arch. exp. Path. Pharm.*, 1874, ii, 254.