standing in glycerol in a dark place, well corked for from 12½ to 13½ years. The esterolytic and peptolytic powers of the clear filtrates have again been tested using dilutions and technique similar to those of the original report.

The results of these experiments show that ground dog's liver preserved in glycerol retained its esterolytic activity unimpaired for 13 years, but lost about one-fourth of its peptone-splitting action during the same period. Ground dog's kidney similarly preserved for 13 years lost slightly less than half its original ester-splitting power and somewhat more than half of its former power to decompose peptone into amino acids.

5312

I. Influence of Eggwhite upon the Absorption of Bacteria from the Intestinal Tract.

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Friedberger[1] states that prolonged boiling of eggs, when fed exclusively, leads to severe trophic disturbances; Newburgh[2] fed eggwhite to rabbits and produced renal injuries after a short period of time. Galanini[3] fed only eggwhite to white rats and caused albumen in the urine before death; Friedberger and Abraham[4] state that egg diets frequently cause toxic effects. The harmful results of an exclusive egg diet are mainly due to the white of the egg (Stenquist,[5] Baglioni,[6] Bateman,[7] Iskikawa,[8] Arnold[9]). In this communication we report the results of experiments dealing with absorption through the blood stream.

The abdomens of 4 dogs, fasted for 24 hours, were opened under

[1] Friedberger, E., *Deut. Med. Woch.*, 1926, **52**, 1766.
[2] Newburgh, L. H., *Arch. Int. Med.*, 1919, **24**, 359.
[3] Galanini, Antonio, *Boll. Soc. Ital. Biol. Sperm.*, 1929, **4**, 91.
[4] Friedberger and Abraham, A., *Deut. Med. Woch.*, 1929, **55**, 383.
[5] Stenquist, F., *Deut. Med. Woch.*, 1928, **54**, 1920.
[6] Baglioni, S., *Boll. d. Soc. Ital di Biol. Sperm.*, 1928, **2**, 978.
[7] Bateman, G. W., *J. Biol. Chem.*, 1916, **26**, 263.
[8] Iskikawa, Issaka, *Jap. J. Med. Science*, 1928, **2**, 205.
[9] Arnold, L., *Am. J. Hyg.*, 1928, **3**, 604.

ether anesthesia and a suspension of *B. prodigiosus* (washings of 24 hours growth on agar plate in 50 cc. NaCl solution) was injected directly into the duodenum. Specimens of blood were taken from the portal vein, femoral vein and artery, every 5 minutes for half an hour, and plated on agar. After 24 hours of incubation at 37°C. the plates were read. In the specimens from the portal vein the results were always positive, and since we found the bacteria also in the femoral vein, though not in such large numbers, we took the specimens only from the femoral vein for subsequent experiments. Repeated puncture of the portal vein and the femoral artery caused hemorrhage and led to experimental errors.

Our experiments were conducted in the above mentioned manner. Suspension of bacteria was made up in NaCl and injected into the duodenum of 6 dogs; bacteria were suspended in one fresh raw eggwhite and injected into the duodenum of 8 dogs. Blood specimens were taken from the femoral vein at various intervals of time and the number of *B. prodigiosus* in the blood calculated per cc. (see chart). The dotted line represents the average amount of *B. prodigiosus* in the blood of dogs in which the micro-organisms were in NaCl solution, and the solid line—a raw eggwhite. The abscissa

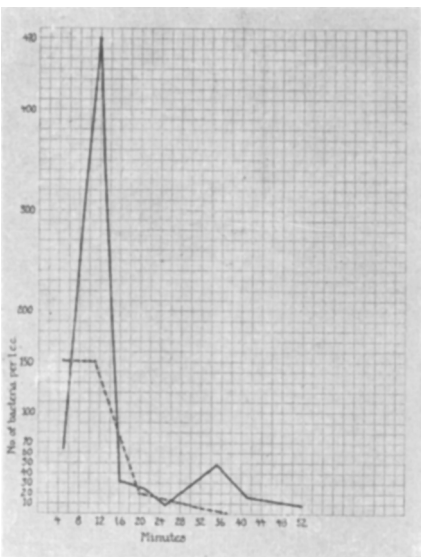

FIG. 1.

Ordinate = Number of bacteria per cc. of blood. Abscissa = Time in minutes.
- - - - - - - = *B. prodigiosus* in blood after saline suspension injected into the duodenum.
——— = *B. prodigiosus* in blood after eggwhite suspension injected into the duodenum.

shows time in minutes and the ordinate shows the number of bacteria per cc. of blood. The study of the action of eggwhite on the permeability of the intestinal wall is being continued.

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II. Influence of Eggwhite upon the Elimination of Bacteria into the Intestinal Tract.

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Raw eggwhite applied to the mucosa of the small intestine will influence the excretion of bacteria from the systemic circulation into the lumen of the small intestine. The preceding article dealt with the absorption of bacteria from the small intestine into the systemic circulation.

The dogs (25 animals) were fasted for 24 hours and operated upon under ether anesthesia. The abdomen was opened and different media were injected directly into the duodenum; normal salt solution used for 12 dogs, and fresh, raw eggwhite used, one eggwhite for each 13 dogs. The common bile duct was ligated and severed in order to exclude the passage of the bacteria into the duodenum by way of the bile. Ten cubic centimeters of a suspension of *B. prodigiosus* (one agar plate of *B. prodigiosus* suspended in 50 cc. of normal salt solution) were injected into the femoral vein and in 25 minutes the dogs were killed. Cultures were taken from the duodenum, upper and lower portions of the jejunum, ileum and caecum, with a sterile swab and smeared on agar plates. These were incubated at 37° for 24 hours. The results showed that *B. prodigiosus* passed through the wall of the intestine and appeared in greater numbers in the duodenum and upper portion of the jejunum, while a far less number was noted in the lower portion of the jejunum and practically none in the ileum and caecum.

The greatest number of bacteria appeared in the dogs in which eggwhite had been introduced into the duodenum, while a much less number appeared in the dogs injected with the saline suspension.

The accompanying chart shows the results of the experiments. The abscissa represents the segments of the intestinal tract and the ordinate the number of colonies grown on the agar plates inoculated