

pig. The reactions induced by the eel sera alone, however, obscured the intracutaneous titration.

The toxicity of eel serum and dogfish plasma was tested on rabbits and guinea pigs. The numerous reports in the literature concerning the toxicity of eel serum for the rabbit were first confirmed: intravenous injection of 0.3 cc. of the seawater-eel serum proved fatal in 27 hours. When the sera of eels which had been gradually adapted to fresh water were tested, 0.3 cc. or even 1.25 cc. failed to prove toxic. The injections of skate plasma, reported in the literature as toxic,<sup>2</sup> gave rise to practically no symptoms in the rabbit. Intracutaneous injection of the guinea pig was also studied. The plasma of the dogfish and the skate, as well as seawater, incited practically no reaction except a slight redness. The sera of the seawater eel and of those habituated to fresh water proved toxic in that they gave rise to marked local reaction with necrosis. The serum of the eel habituated to fresh water appeared to be less toxic in these experiments.

The period of incubation after injection suggests a complex mechanism determining the action of toxin in the tissues. The action of diphtheria toxin in the seawater eel, as compared with its action in the guinea pig, is delayed. In fresh water the susceptibility of the seawater eel is increased; and the dogfish, ordinarily immune, becomes susceptible when transferred to an environment of half fresh and half seawater.

## 7006 C

### Normal Emptying Time of the Stomach of the Dog.

EDWARD J. VAN LIERE AND GEORGE CRISLER.

(Introduced by A. J. Carlson.)

*From the Department of Physiology, University of West Virginia.*

In the course of experimental work on the effect of anoxemia on the emptying time of the stomach of the dog a good deal of control data was obtained. It was felt that these data might be of interest and use to other workers, especially as there appears to be a considerable difference of opinion as to the time it takes the stomach of a dog to empty.

Dogs varying in weight from 5 to 10 kilos were used in these

---

<sup>2</sup> Camus, Lucien, and Gley, E., *C. r. Soc. de biol.*, 1915, **78**, 203.

experiments. They were fed approximately the same time each day. The experimental meal consisted of 40 gm. of hamburger steak, 10 gm. of dried ground bread and 50 cc. of milk; 15 gm. of barium sulphate were added so that the stomach contents could be seen with the x-rays. The animals ate this meal with relish. Immediately afterward they were put into a large steel respiratory chamber so that they would be protected from extraneous influences. The chamber was kept well ventilated by means of an air pump of large capacity. It was necessary, of course, to remove the animals from the chamber in order to examine them fluoroscopically. This procedure took from 5 to 15 minutes, so that an experimental error of a plus or minus 15 minutes was allowed.

TABLE I

No. of dog	Average emptying time of stomach hr.	No. exp.
1	6.86	16
2	6.11	7
3	6.12	2
4	8.00	6
5	7.21	7
6	7.66	5
7	6.75	7
8	6.65	26
9	6.54	12
10	5.75	3
11	6.00	4
12	5.42	3
13	6.66	9
14	6.89	12
15	7.06	8
16	6.29	13
17	6.39	16
18	7.65	5
19	5.50	11
20	6.25	4
21	6.06	4
22	6.70	5
23	8.07	4
24	6.21	7
25	5.88	4

*Summary.* Twenty-five dogs were used; a total of 200 tests was run. The average emptying time of the stomach of the dogs was 6.59 hours; the mean was 6.54 hours. The average for the tests was 6.61 hours and the mean 6.62. The extremes for the emptying time were 5.42 hours and 8.07 hours.

It was interesting to observe that the normal emptying time of the stomach for an individual dog was remarkably uniform from day to day. It was necessary, of course, to keep all the factors quite constant. As a matter of fact the extremes for the 25 dogs as

before mentioned were 5.42 hours and 8.07 hours—a variation of only 2.65 hours. No correlation was noticed as to size or breed.

The results reported in this paper are higher than those obtained by Ivy<sup>1</sup> and by Thomas.<sup>2</sup> The former reports the normal emptying time of the stomach in 5 dogs as varying from 4 hours and 28 minutes to 5 hours and 17 minutes. He used a meal of 125 gm. of Swift's Silver Fox Food and 100 cc. of milk. Thomas states that a dog fed about 300 gm. of dog biscuit and a pint of milk would probably empty in somewhere around 3 hours. Both of these authors used a different type of meal from the one reported in this paper and this probably accounts for the difference in results. The experimental meal we used proved very successful in our work and we can recommend it highly; it is fairly well balanced; the dogs ate it with relish and small dogs subsisted solely on it.

*Conclusions.* The normal emptying time of the stomach was determined on 25 dogs under carefully controlled conditions. The meal consisted of 40 gm. of hamburger steak, 10 gm. of dried ground bread and 50 cc. of milk; barium sulphate was added (15 gm.). A total of 200 tests were made. The average emptying time of the stomach of the dogs was 6.59 hours; the average for the tests was 6.61 hours. The variations were between 5.42 and 8.07 hours. It was found that the emptying time of the stomach for an individual dog was strikingly uniform from day to day.

## 7007

### Effect of Massage on Blood Platelet Production.\*

S. P. LUCIA AND J. F. RICKARD. (Introduced by Wm. J. Kerr.)

*From the Department of Medicine, University of California Medical School, San Francisco.*

Fenn<sup>1</sup> demonstrated the ease with which erythrocytes undergo hemolysis when they come in contact with glass. Davidson<sup>2</sup> showed that a relatively large proportion of erythrocytes contain basophilic staining-substance. Watson<sup>3</sup> concluded that "the fragments of

---

<sup>1</sup> Ivy, A. C., and Fauley, G. B., *Am. J. Physiol.*, 1929, **91**, 206.

<sup>2</sup> Thomas, J. E., *J. Am. Med. Assn.*, 1931, **97**, 1663.

\* Assisted by a grant from the Christine Breon Fund.

<sup>1</sup> Fenn, W. O., *J. Exp. Med.*, 1922, **35**, 271.

<sup>2</sup> Davidson, L. S. P., *Edinburgh Med. J.*, 1930, **37**, 425.

<sup>3</sup> Watson, C. H., *Edinburgh Med. J.*, 1932, **39**, 229.