

tions below 0.005%, when the ordinary bacteriophage suspensions were used or when such suspensions were diluted 1-10 with Martin's broth.

Similar tests have been carried out with various other dyes including toluidine blue, methylene violet, methylene green, methylene azur, thionin, eosin B, and phenol red. These dyes were added in relatively high concentrations to bacteriophage filtrates which were then incubated at 37°C. for 24 hours or longer and tested for lytic activity. Of the series tested in this way only one, *toluidine blue*, served to inactivate the staphylococcus bacteriophage.

Several individual samples of the same brand of toluidine blue† have given results which in all respects were similar to those obtained with methylene blue. When incompletely inactivated dye-phage mixtures were plated out with susceptible organisms a diminution in the number of plaques was noted, both in the case of methylene blue and of toluidine blue.

Tests were made with the dye-phage mixtures which were incubated in an atmosphere of hydrogen, nitrogen, or oxygen. The results obtained were identical with those described above, while controls incubated under the same conditions retained their lytic activity.

Inactivation was not obtained with either methylene blue or toluidine blue when added to an anti-coli bacteriophage. The results, therefore, indicate that the inactivation is a specific phenomenon, affecting particularly the staphylococcus bacteriophage. Filtration studies suggest that the inactivation is probably due to an adsorption phenomenon.

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The Hearts of Wild Animals in Captivity.

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Comparative anatomical studies of the heart in various mammals, with reference especially to the relation of the heart weight to the body weight, have yielded much interesting information. It was shown previously¹ that the heart of the racing greyhound averaged 13.8 gm. per kilo of body weight and stood at the top of the animal

† National Toluidine Blue (3 samples).

¹ Herrmann, George, *Proc. Soc. Exp. Biol. and Med.*, 1926, xxiii, 856.

series in respect to relative heart size. It was also found that even the young greyhounds who had been confined to small kennels had relatively large hearts. Similar conditions but less striking figures were found in the study of the heart of the thoroughbred race horse² in which the average of 8.65 gm. of heart per kilo of body weight would indicate a similar change. This enlargement of the heart was present also in the young horses, colts and yearlings. The seasoned racers in both series had relatively enormous hearts. It was suggested that there was perhaps an inheritance of this acquired characteristic in the enlarged heart which had the capacity for even greater enlargement under stress. The factor of selection in breeding, however, was considered probable as a most potent factor. The greyhound heart averaged 5 gm. per kilo higher than did the heart of the ordinary dog, 13.8 as contrasted to 7.98. The thoroughbred's heart averaged about 2 gm. more per kilo than the ordinary horse's heart, 8.76 as contrasted to 6.77.

Opportunity was afforded for pursuing comparative anatomical heart weight-body weight studies on the animals that had to be sacrificed or died in the zoo, and thus was added interesting information on the question of the relation of heart weight to activity from another point of view. The causes of death in these animals were those that do not affect heart weight. Most of the animals had been born in the wilds and had been in captivity since youth. A few were born in captivity. Younger animals as a rule, even though born in captivity had relatively larger hearts than the older animals. Increase in weight due to the sedentary life in the cages was probably conducive to abnormal body weight and thus disturbed the proportion. The heart of a baby stag red deer reached the high proportion of 15.4 gm. of heart per kilo of body weight, while in a full grown doe there were only 6.1 gm. of heart per kilo of body weight. The young male wolf was found to have 12.4 gm., while the female adult had 10.8 gm. of heart per kilo of body weight. The wolves thus averaged about 11.5 gm., which is 3 gm. more than the average for the police dog and 3.5 gm. more than the average for the ordinary dog. The sea lions averaged 7.56 gm., the lion cub of five months 7.11 gm., and an eleven months old lion, 4.77 gm. The leopard cubs averaged 6.5 gm. The wallabys averaged 7.05 gm., while a kangaroo was only 6.38 gm. per kilo. In the primate series the Sapajou monkeys averaged 6.43 gm. and about eight *Macacus rhesus* monkeys gave an average of 6.11 gm. The pig tailed monkeys 4.26 gm. and 2 green monkeys

² Herrmann, George, PROC. SOC. EXP. BIOL. AND MED., 1929, xxvi, 549.

4.16; while the Japanese ape showed 5.0 gm. and a Sphinx baboon 4.05 gm. of heart per kilo of body weight. The squirrels averaged about 5.89 gm., the puma 4.63 gm., raccoon 4.22 gm., tapir 3.71 gm., and the sloths averaged 3.96 gm. The sloth thus takes the lowest position in the wild animal scale and the average is almost as low as that presented by the rabbit, which in the domesticated type is as low as 2.36 gm. per kilo of body weight. This series, incomplete though it is, tends to add weight to the idea that there is some fundamental relationship between the activity of the individual mammal and its heart weight, body weight ratio. The more sluggish the animal the relatively small the heart and the less the ratio. The size of the animal is perhaps a factor in some instances, in that in general in the large animals the body weight runs into hundreds of kilos and there is a tendency to have smaller hearts, in proportion to these great weights.

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**Observations on the Effect of Dog's Gastric Juice in
Pernicious Anemia.**

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This experiment was undertaken to determine the effects of large amounts of dog's gastric juice on a patient suffering with pernicious anemia. Castle and Townsend¹ previously had shown that 300 cc. of human gastric juice administered daily for a 10-day period did not improve the patient symptomatically nor produce any change in the blood picture. Because the amount of gastric juice secreted each 24 hours by man is far in excess of the 300 cc. used, it was thought worth while to repeat the procedure with larger doses.

For this experimental work pure, crystal clear dog's gastric juice was used. This was procured in large quantities from Dragstedt² at whose suggestion the experiment was performed. He had obtained the juice in a previous work by creating a pouch of the entire stomach of the dog in such a way as to avoid injury of the fibers of the vagus or of the blood supply. The analysis of the product

¹ Castle and Townsend, *Am. J. Med. Sci.*, 1928, clxxviii, 693.

² Dragstedt, L. R., and Ellis, C. E., *Proc. Soc. Exp. Biol. and Med.*, 1929, xxvi, 305.