after the last heavy water injection. Since the specific gravity of pure deuterium oxide is 11.079, this figure is interpreted as suggesting that at this point each mouse was about 13.5% saturated with heavy water. The exact equivalence, however, of the D_2O/H_2O ratio in insensibly lost water to the ratio existing in the body remains still to be quantitatively determined.* Inasmuch as the second mouse showed a slower and less decisive fall of the metabolism, it is argued that a better condition of hydration with H_2O at the onset of a heavy water experiment tends to protect against the effect of the latter substance. This hypothesis that more subtle penetration of D_2O can be obtained in dehydrated animals remains to be tested.

So far as can be judged, both mice showed as great activity throughout the heavy water treatment as in their previous condition. The only exception to this was a slight depression in the respiratory rate observed in each mouse after the first D_2O run. They appeared otherwise to be as alert and to eat as much at all times. There is no reason to ascribe the fall in metabolism to diminution either in activity or in food intake. This statement is well borne out by the maintenance throughout the D_2O periods of essentially the same respiratory quotient as found during the immediately preceding normal periods. The question of true basal metabolism in the mouse has been dealt with by Benedict and Fox[8]; while the present work does not probably present the mice at their basal levels of metabolism, there is no reason to doubt that the chief factor in the metabolic fall seen in each case was the inhibiting effect of deuterium oxide upon the activity of the cells.

8097 C

Effects of Light and Dark Environment on Weight Changes in Normal and Hypophysectomized Frogs.

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It is a well established fact that the pituitary gland of the frog plays an important rôle in the dilatation and constriction of the melanophores in dark and light environments. It was shown by

* It may be disturbed by the loss of deuterium to carbohydrate and urea.

one of us[1,2] that injections of extracts of the posterior lobe of the pituitary gland produce a marked increase in water uptake in frogs as well as dilatation of the melanophores. Subsequently we became interested in the problem as to whether or not environmental background had any effect on the rate of weight changes in frogs kept constantly in water. The solution of this problem we feel, would help to determine whether the weight increase in frogs, resulting from the injection of pituitrin, is actually related to dilatation of the melanophores or to a more specific skin permeability.

Two sets of experiments were carried out. In the first, 3 different groups each containing 6 normal frogs, were removed from water, dried carefully with gauze, and then weighed accurately to 0.1 gm. They were then put back in water on a white background. Within 12 hours they had responded to this environmental change by becoming lighter in color, due to a contraction of melanophores. After 4 days in this environment they were again removed, dried, weighed, and then transferred to a black background to which they responded by a dilatation of melanophores, and where they remained for 4 more days. Following this they were transferred to a neutral background which consisted of a galvanized tank, for the same interval of time, and they were finally transferred back to the white background for the last 4 days of the experiment. Thus, each group of frogs was exposed to 4 different environmental backgrounds in 16 days with weights recorded between each change.

In the second set of experiments 6 frogs, hypophysectomized 4-5 days previous to the experiment to preclude melanophore changes, were exposed to changes in environmental background and weighed in the same way as were the normal frogs for the 16-day period.

The results show that all of the frogs in both the control groups and the hypophysectomized group, lost weight continuously from the beginning of the experiment until the end regardless of the change in environmental background. The final weight loss for each group after a period of 16 days was as follows: 12.5%, 8.8% and 7.7% for the control groups, and 12.3% for the hypophysectomized group. The individual variations in weight loss amounted to ±3% for the control group and ±7% in the experimental group. It was reported by Dietel[3] that in his experiments hypophysectomized frogs gained in weight, but usually died after 4 or 5 days. In

[1] Steggerda, F. R., *Am. J. Physiol.*, 1931, **98**, 255.

[2] Steggerda, F. R., and Essex, H. E., PROC. SOC. EXP. BIOL. AND MED., 1934, **32**, 425.

[3] Dietel, F. G., *Klin. Wochen.*, 1932, **11**, 2075.

the present work, such results were obtained only in cases where the brain had been injured in the process of removing the pituitary.

The experiments were done during the months of February and March on different shipments of frogs at room temperatures estimated to be about 22°C. with a fluctuation of not more than ±3°C. These factors may be partly responsible for individual variations in weight losses in the different groups, although it is admitted that the nature of the operation may be responsible for the wider variation in the hypophysectomized group. Since there is no real consistent difference in rate of weight loss in frogs with or without the power (due to hypophysectomy) of dilatation and constriction of melanophores, we conclude that changes of background have no effect on the ability of the frog to retain or lose water.

8098 P

Contracture of the Rectus Abdominis, Tetany, Calcium and Phosphorus, after Spinal Transection, with and without Thyroparathyroidectomy.

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As one phase of some observations on the effects of parathyroidectomy on cats,[1] a previous study[2] showed that on stimulation of the rectus abdominis muscle following thyroparathyroidectomy, more contracture usually appeared than was the case with the same muscle stimulated in the same manner in control animals. During the past months a series of experiments has been done on 20 cats in which the ionizable calcium and inorganic phosphorus of the blood were determined from 2 to 3 days after (1) aseptic transection of the spinal cord alone in the upper thoracic region and (2) when thyroparathyroidectomy was done at the same time as the spinal transection. The working power of the curarized muscle, together with the presence or absence of tetany and of contracture, was determined in the same manner as in previous experiments.

The results are given in Table I .

[1] Coombs, H. C., Searle, D. S., and Pike, F. H., *Am. J. Psychiatry*, 1934, **13**, 761.

[2] Coombs, H. C., and Searle, D. S., *Am. J. Physiol.*, 1934, **109**, 23.