and introduced intracecally, the host noticeably improved. On return to oral administration the infection promptly fulminated. When peptic and tryptic digests of salmon were introduced intracecally (30 cc. containing 25 gm. of the canned product *per diem*), the dogs became seriously ill on the sixth day and the condition rapidly fulminated. On sacrifice on the tenth day the large intestine of each dog was studded with amebic lesions.

In addition, liver and ventriculin (15 gm. each, suspended in 100 cc. of water *per diem*), and liver and salmon (15 gm. each *per diem*) were combined and administered intracecally. In the former experiment the liver failed to counteract the effect of the ventriculin but in the latter marked clinical improvement and recovery were effected and on sacrifice (on the 12th day) no amebae and no unhealed lesions were discovered.

7756 P

Water Balance in Adrenal Insufficiency and Inanition.*

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Recent reports of water balance studies during adrenal insufficiency in the dog[1, 2, 3] indicate that in that animal urine volumes, following cessation of cortin injections in adrenalectomized animals, are maintained at or above normal levels in spite of lowered water intake, with little or no reduction until shortly before death. Harrop, *et al.*,[2] attribute the hemoconcentration which occurs during adrenal insufficiency to loss of fluid by way of the kidneys, and Swingle, *et al.*,[3] also regard such loss as an important factor in reduction of plasma volume, though not the sole one.

The experiments herein reported were undertaken to ascertain whether similar results could be obtained with the cat, and whether

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1 Loeb, R. F., Atchley, D. W., Benedict, E. M., and Leland, J., *J. Exp. Med.*, 1933, **57**, 775.

2 Harrop, G. A., Weinstein, A., Soffer, L. J., and Trescher, J. H., *J. Exp. Med.*, 1933, **58**, 1.

3 Swingle, W. W., Pfiffner, J. J., Vars, H. M., and Parkins, W. M., *Am. J. Physiol.*, 1934, **108**, 428.

any changes in water balance could be specifically referred to adrenal insufficiency.

Seven cats were used in these experiments; 3 of them were adrenalectomized and were on a maintenance dosage of cortin before experiments began; the other 4 had one adrenal out in the beginning, and the second adrenal was removed during the course of the investigation. One cat was followed not only during 2 such periods of adrenal insufficiency, but also during one period of recovery following cortin deficiency. Two cats were used during periods of gradual reduction of food intake simulating the reduction which occurs in the development of adrenal insufficiency, then a period of increasing food intake simulating recovery from insufficiency; finally the one remaining adrenal was removed and the same animals studied during the development of cortical insufficiency.

The water intake in food and drink was measured, and the metabolic water calculated. The water output in urine and feces was measured, and in addition a rough estimate of the insensible loss was made from the data on intake and output and the daily weight changes of the animal.

In contrast to the results reported by other investigators for dogs, the cats in these experiments invariably showed a decrease in urine volume immediately on the onset of adrenal insufficiency, the decrease accompanying the reduced intake. However, the reduction in intake was slightly more rapid than that in output, so that the water balance was relatively negative during cortical deficiency as compared with the normal period, a finding in agreement with Swingle, *et al.*[3]

During recovery from adrenal insufficiency, water intake increases somewhat more rapidly than does the output, so that the curves for the recovery period are the reciprocal of those for the development of insufficiency. This is in marked contrast with the results obtained on dogs by Swingle[3] who stated that the water balance was still more strongly negative during recovery than during insufficiency.

The water balance results obtained on cats during adrenal insufficiency and recovery were duplicated on animals in good health with only one adrenal removed, by gradually reducing food intake, and then increasing it again. This finding indicates that the water balance conditions of the total organism have no specific relation to adrenal insufficiency, but are merely a consequence of the nutritional state. Therefore, the hemoconcentration of adrenal insufficiency can not be even partially explained, in the cat at least, by loss of fluid by way of the kidneys, but the explanation must come from a study of the factors involved in the abnormal distribution of water within the body. That the total water exchange can not account for all the symptoms of adrenal insufficiency is further indicated by the work of Caldwell,[4] who found that the water content of adult cats could be reduced practically to the vital limit without disturbance in the thermoregulatory mechanism, whereas such disturbance is one of the notable features of cortical deficiency.[5, 6]

The values found for insensible weight loss do not differ significantly during adrenal insufficiency from the corresponding values during the normal period. This is interesting in view of the lowered metabolism during cortical deficiency, and the view expressed by some authors[7] that insensible weight loss follows the basal metabolism so closely that the former can be used as a measure of the latter.

7757 C

Anti-Gonadotropic Substances.

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Both the gonadotropic hormone prepared from the pituitary gland and the anterior pituitary-like hormone of pregnancy urine (A.P.L.) lose their gonad-stimulating effect after a certain time, if given daily over a long period, but this loss of sensitivity is limited to the gonadotropic preparation with which the animals have been injected previously. Animals which become insensitive to pituitary implants remain sensitive to A.P.L. and *vice versa*.[1, 2] It has also been found that a state of passive A.P.L. resistance may be induced in immature female rats by the administration of the blood of A.P.L.-resistant

[4] Caldwell, G. T., *Physiol. Zool.*, 1931, **4**, 324.

[5] Hartman, F. A., Brownell, K. A., and Crosby, A. A., *Am. J. Physiol.*, 1931, **98**, 674.

[6] Hartman, F. A., Brownell, K. A., and Lockwood, J. E., *Endocrinology*, 1932, **16**, 521.

[7] Benedict, F. G., and Root, H. F., *Arch. Int. Med.*, 1926, **38**, 1.

[1] Selye, H., Collip, J. B., and Thomson, D. L., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 487.

[2] Selye, H., Collip, J. B., and Thomson, D. L., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 566.