ments when once generated. Our results are in accord with the investigations of Hirschfelder[1] in 1908, which indicated that increased irritability of the heart muscle is one of the important factors in the genesis of auricular fibrillation.

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The effect of pituitrin on blood and on lymph and urine production.

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The diuretic action of pituitary extract described first by Magnus and Schäfer[1] has since been observed by many. More recently an anti-diuretic action of this extract has been observed, especially in connection with *diabetes insipidus,* and in relation to water intoxication. (For literature see Weir, Larson and Rowntree.[2]) On account of its diuretic action one might expect some effect on the composition of the blood. Underhill and Pack[3] and Mackersie[4] observed a dilution of the blood after pituitrin injection, but only a few experiments were made. Rowntree,[2] however, observed no change in blood volume, and Lamson,[5] who injected physiological salt along with pituitrin observed no change with small doses, but found that after large doses of pituitrin, the physiological salt did not leave the blood as it normally does, but kept the blood diluted for hours.

We have followed the concentration of the blood in 20 dogs after pituitrin injection, using 2 or 3 cc. of Parke Davis's ob-

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[1] Hirschfelder, A. D., *Bull. Johns Hopkins Hospital,* 1908, xxix.

[1] Magnus, R., and Schäfer, E. A., *J. Physiol.,* 1901, xxvii, 9.

[2] Weir, J. F., Larson, E. E., and Rowntree, L. G., *Arch. Int. Med.,* 1922, xxix, 306.

[3] Underhill, F. P., and Pack, G. T., *Am. J. Physiol.,* 1923, lxvi, 520.

[4] Mackersie, W. G., *J. Pharmacol. and Exp. Therap.,* 1924, xxiv, 83.

[5] Lamson, P. D., Abt, A. F., O. Osthuisen and Rosenthal, S. M., *J. Pharmacol. and Exp. Thearp.,* 1923, xxi, 401.

stetrical pituitrin. In 16 of these cases the effect was so very slight as to be within the limit of error. Most of the slight effects observed tended to be more toward dilution than towards concentration. In one case there was a marked dilution of the blood; the hemoglobin falling to 74.1 about an hour after injection, corresponding to the effect observed by Underhill. In three cases there was a marked increase in the concentration of the blood, the hemoglobin rising to 111, 108 and 107, respectively. A concentration of the blood is what one might expect[6] from a rise of blood pressure. We have also confirmed Lamson's observations that physiological salt is delayed in its exit from the vessels.

The flow of lymph from the thoracic duct has been followed in 11 cases, and in 9 of these the urine flow was also studied. In every case the injection of pituitrin caused a marked slowing of the lymph flow which lasted some time. One example may be given from a dog anaesthetized with morphia and ether: normal from the thoracic duct, 3 drops per minute; injection of physiological saline (300 cc.) caused an increase to 13 drops per minute; injection of 2 cc. pituitrin caused a drop to 6 cc. per minute which remained at that level for one hour, when a further injection of physiological saline (200 cc.) caused an increase to 23 drops per minute. A second injection of pituitrin reduced it to 9 drops in three minutes, and to 3 drops, 15 minutes later, when the flow gradually increased to 12 drops. A third injection of pituitrin reduced it again to 6 drops.

Another example showing the relation of lymph and urine flow may be given. These are drops per minute for the first ten minutes after, and the 15th and 20th minute.

Lymph	3	4	|	7	4	1	0	1	1	1	1	2	2.....3.....7
Urine	16	15	|	11	7	3	29	48	34	45	43	42	38.....24.....19
			x										

At x injection of 2 cc. pituitrin.

The remarkable manner in which the lymph flow is cut down by pituitrin should be noted, and also the temporary slowing down of urine flow. This was also observed by Schäfer and Magnus. We believe the results on lymph flow and the results on the manner in which pituitrin keeps physiological saline in the blood, as well as its effect in *diabetes insipidus* and water intoxication, can only be explained on the basis of its rendering the capillaries less per-

[6] Scott, F. H., *Am. J. Physiol.*, 1917, xliv, 298.

meable. Even the cells of the kidney seem to be rendered less permeable, but the increased blood pressure overcomes this effect and diuresis follows. The diuretic action of pitutrin probably depends on the vascular changes in the kidney (Knowlton and Silverman[7]) while its anti-diuretic action depends on the lessened permeability of the cells. The dilution of blood following pituitrin is, we believe, due to the absorption of fluid from the intestinal tract and the subsequent holding of the fluid in the blood.

[7] Knowlton, F. P., and Silverman, A. C., *Am. J. Physiol.*, 1918, xlvii, 1.