high even when the blood pressure was lower than usual for that individual. A related observation has been made before in this laboratory[11] with a less satisfactory method when pulse wave velocity in patients with hypertension actually increased following a drop in pressure produced by nitrites.

The observations here reported and others to be published later indicate to us that changes in arterial tone largely independent of the blood pressure may greatly influence pulse wave velocity in the brachial and radial arteries. Such a concept gives to the artery not a passive rôle, merely distended by its internal pressure, but ascribes to it an active dynamic rôle more in keeping with its known muscular equipment. Final interpretation of data such as here presented is impossible without knowledge of the changes in arterial calibre which is an important variable influencing pulse wave velocity.

It was noted also that as the conditions of the experiment approach more closely the basal conditions laid down for the determination of basal metabolism and cardiac output that pulse wave velocity became lower and less variable.

7340 P

Relation of Adrenals to Diabetes.*

FRANK A. HARTMAN AND KATHARINE A. BROWNELL.

From the Department of Physiology, University of Buffalo.

Frouin[1] found that pancreatectomy produced less glycosuria than usual, in dogs from which a considerable amount of adrenal tissue had been removed. Later work[2] has indicated an interrelationship between the adrenal and the pancreas. The adrenal cortex is necessary for the development of severe diabetes.[3] The medulla, however, may be significant in preventing insulin shock.[4]

If the cortex is necessary for the full development of diabetes, is its cortin-producing or some other function responsible?

11 Turner, R. H., and Herrmann, G. R., *J. Clin. Invest.*, 1927, **4**, 430.

* Aided by a grant from the Carnegie Corporation of New York to the Carnegie Institution of Washington.

1 Frouin, A., *Compt. rend. Soc. de Biol.*, 1908, **64**, 216.

2 Riddle, O., Honeywell, H. E., and Fisher, W. S., *Am. J. Physiol.*, 1924, **68**, 461.

3 Turcatti, E. S., *Rev. Méd., Rosario*, 1929, **19**, 269.

4 Boggild, D. H., *Acta Med. Scand.*, 1933, **79**, 458.

We have studied 9 cats in an attempt to throw light upon this problem. In 3 animals the right adrenal and part of the pancreas, then several days later the left adrenal and the rest of the pancreas, were removed. Two died in less than 24 hours, with blood sugars of 49 and 61 mg. per 100 cc. respectively. The third survived 6 days. Injected with cortin it showed a small increase in blood sugar from 98 to 156 mg., and slight glycosuria.

The remaining adrenal of 2 pancreatectomized, unilaterally adrenalectomized cats was denervated after establishment of diabetes. Eight days after denervation one animal showed reduction in diabetes; the other showed no reduction for 3 weeks and then only after cautery of the medulla and much of the adrenal cortex.

Four cats were kept alive by cortin injections after removal of the second adrenal, the pancreas having been removed in a 2-stage operation at the time of the adrenalectomies.

One cat showed some reduction in the glycosuria after the second adrenal was removed. Death occurred on the eighth day, perhaps from insulin, which was injected for the first time on that day.

The second cat refused to eat following the removal of the second adrenal. The high blood sugar (279 mg. per 100 cc.) and the glycosuria (maximum 290 mg. of glucose per hour) did not fall during the time of observation (4 days). He was killed in another experiment.

The third cat, kept alive with cortin for 13 days, showed some reduction in diabetes after the second adrenal was removed. The amount of sugar in the blood and urine was then determined at least in part by the amount of cortin, as well as the food eaten. With cortin insufficiency appetite fell and glycosuria dropped to little or none. Resumption of cortin treatment brought recurrence of diabetes although not to the former level.

The fourth animal was studied for 2 months, 38 days after total adrenalectomy. For 3 weeks or more during this latter period there was no reduction in diabetes but after this time there was marked reduction which large amounts of cortin failed to restore.

Our results indicate that cortin is essential for the maintenance of diabetes.