

days they cease to act as sensitizing agents for normal dogs. We have endeavored to follow subsequent changes in these proteins.

Titration by means of a specific horse-protein-precipitating rabbit serum indicate that the proteins are further altered, denaturated or inhibited. By the end of 30 days they give little or no demonstrable reaction with rabbit precipitin, if tested in low dilutions.

That this negative reaction is not due to an absence of horse proteins from the 30-day blood sample is indicated by continuing the titration to higher dilutions (Table I). In dilutions above 1:1000, the 6-day and 30-day samples give practically identical precipitates and turbidities.

The horse proteins thus further altered are apparently retained quantitatively for at least 4 months (latest titration thus far made). Within the limits of the experimental error the 4-month and 30-day blood samples give identical precipitates in all dilutions.

4027

A Rubber-Opposed Haemodromograph Used to Measure Reflux in Aortic Insufficiency.

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The measurement of blood flow throughout the cardiac cycle has been accomplished by use of instruments of rather low efficiency due to their heavy construction and the use of more sensitive instruments has been restricted by the difficulties attending their use. We have attempted to construct a simple instrument for use in studying reflux. The lever of the aortic haemodromograph is of fine aluminum wire, the fulcrum a water-tight strip of rubber dam fixed between 2 metal plates. An oval aluminum vane, 6x8 mm., fixed at one end of the lever projects into the aorta at right angles to the direction of flow; the connection is made air-tight by an oval shoe and threaded washer (Fig. 1). The length from vane to fulcrum is 2 cm., from fulcrum to the strand of rubber used to damp the lever is 5 cm., and a fine brass wire projects 3 cm. above this, its shadow registering on the moving film. The haemodromograph for the carotid is incorporated in the side of a brass tube, 4.5 mm. in diameter, which is introduced between cut ends of the vessel. The lever is damped 5 mm. from its fulcrum, the vane extends 4 mm.

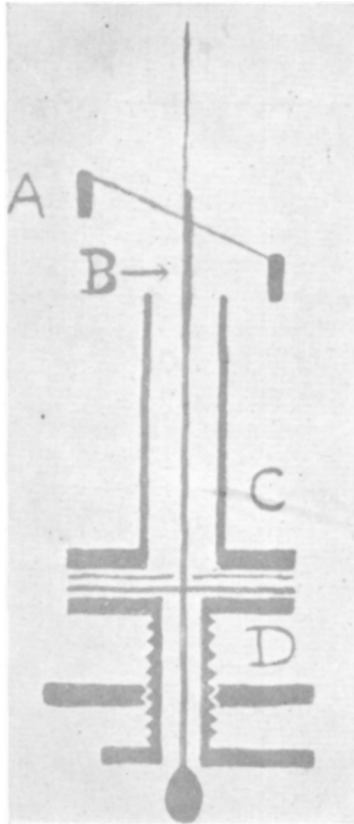


FIG. 1.

Schematic diagram of aortic haemodromograph. A. Rubber strand at right angles to direction of flow. B. Lever with vane in aorta and fine wire projecting into beam of light. C. Upper half of canula. D. Lower half with shoe at opening and threaded washer, between which the aorta is held. Between C and D is a piece of rubber dam and a perforated metal plate forming the fulcrum for B.

into the blood stream and the fine wire extends 3.5 cm. from the fulcrum. The calibration of the apparatus, by measuring deflection produced by known rates of constant flow, is theoretically simple and accurate. In practice with our rather crude instruments we have found such calibration misleading, as the deflection is not constant from day to day, and small wisps of fibrin deposited on the vane produce a marked deviation. At present it can be used only for studying the shape of the curve of rate of flow. The instruments used have a vibration frequency of 50-80 per second; decrement per beat is from 20-30%. The sensitivity and decrement can be varied by varying the tension of the elastic strand. The relation-

ship between deflection of the lever and rate of flow is not linear. With increasing velocity the sensibility of the instrument for a given increment of speed is increased.

In Fig. 2, it will be noted that there is no movement of blood in the aorta in diastole, in fact there seems to be a slight back-flow at the end of systole. The lever is vibrated by the closure of the semilunar valves. In the carotid there is a slight but appreciable flow of blood in diastole, but the curve is much like that in the aorta. Destruction of one or more aortic leaflets, in acute experiments, produces a definite back-flow of blood in the aorta (Fig. 3). With two leaflets destroyed the regurgitation equals or surpasses 50% of the total blood ejected in systole. The proportion of regurgi-

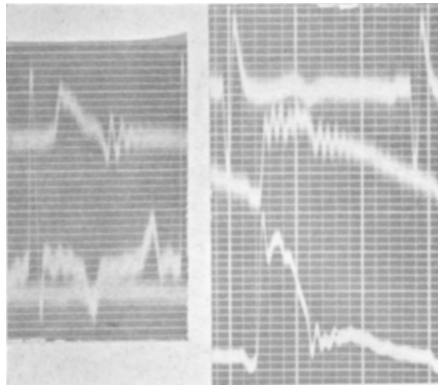


FIG. 2.

A. Upper curve, rate of flow in aorta, lower E. K. G. The peak of flow equals about 800 mm. per second. B. Upper curve E. K. G., middle blood pressure, lower rate of flow in carotid. Time $1/5$ and $1/25$ seconds.

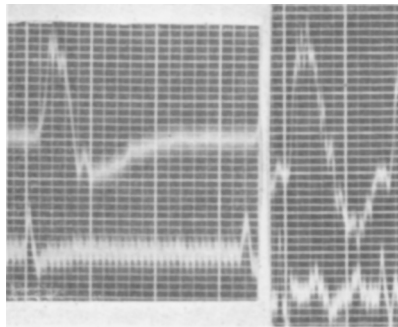


FIG. 3.

Lower curves E. K. G., upper curves aortic blood flow after destruction of 2 aortic cusps. From different animals. The peak of flow in both is about 1200 mm. per second; the damping is greater in the first curve and the circulation more depressed by anesthesia and operation.

tated blood varies with the state of the circulation, being least when the animal is in shock. The destruction of 2 leaflets, in such acute experiments, is fatal in from 30 to 60 minutes. These curves were obtained from dogs anesthetized with chloretone and heparinized after exposure of the great vessels.

4028

Effects of Daily Pituitary Heterotransplants on an Hypophysectomized Puppy.

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Recent results obtained by Smith and Engle¹ by daily hypophyseal homeo and heterotransplants in mice and rats led to an investigation of the effect of daily injections of fresh rabbit pituitary gland on an hypophysectomized puppy. Aschner² published striking photographs of hypophysectomized puppies of various ages which had remained infantile in appearance and size until sacrificed.

Evans and Long³ found that fresh anterior lobe fluid given intraperitoneally to immature rats produced gigantism. Later, this extract was found to stimulate hypophysectomized rats to normal growth but failed to affect their sex glands. Smith,⁴ using fresh pituitary glands of rats, was able completely or in large measure to cure the disabilities arising from hypophysectomy in immature rats. Smith and Engle⁵ were able to induce precocious sexual maturity both in immature and in hypophysectomized rats, in 2 animals within 36 hours, by these fresh daily transplants. By means of the intracranial approach of Dandy and Reichert⁶ a total hypophysectomy was performed on a 6 weeks old female puppy and the base of the brain in the infundibular region cauterized by heat. This animal was constantly kept with her control litter mate, also female. After months of observation, she remained infantile, failed

¹ Smith, P. E., and Engle, E. T., *Am. J. Anat.*, 1927, xl, 159.

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⁴ Smith, P. E., *J. Am. Med. Assn.*, 1927, lxxxviii, 158.

⁵ Smith, P. E., and Engle, E. T., *Proc. Soc. Exp. Biol. and Med.*, 1927, xxiv, 561.

⁶ Dandy, W. E., and Reichert, F. L., *Bull. Johns Hopkins Hosp.*, 1925, xxxvii, 1.