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10548 P

Agents Causing Cardiac Supernormality.

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Studies have been conducted on the electrical excitability of the excised turtle ventricle perfused by means of a Straub type cannula with an oxygenated, bicarbonate buffered saline mixture. The preparations have in some cases not been spontaneously rhythmic or have beat at a slow rate. On these it has been possible to obtain rather complete data concerning the changes in excitability throughout the cardiac cycle. In other instances with spontaneously rhythmic, rapidly beating ventricles, it has been possible to obtain only limited information.

Supernormality has been produced or increased by increase in the ratio of calcium to potassium in the perfusate, by reduction of the sodium bicarbonate, by addition of veratrin, and by addition of

strophanthin. The period of supernormality has in many cases been followed by a period of prolonged subnormality.

In the nonrhythmic preparation, the development of supernormality may result in the production of 2 or more responses following a single electrical stimulation. Such Lucianni groups have been directly attributed to supernormality by Ashman and Hafkesbring.¹ In the spontaneously rhythmic preparation, supernormality may result in the production of occasional extrasystoles, of regular coupling of beats, and of shorter or longer bursts of tachycardia. In this stage there may be multiple beat foci and with severe poisoning fibrillation may ensue. The similarity of this series of events to the effects seen with toxic dosages of the digitalis-like drugs on the mammalian ventricle is striking and there seems no reason to doubt that the mechanism is the same for the two cases.

The methods by which we have produced supernormality in the ventricular preparation are those which will cause its production in the nerve trunk (Graham^{2, 3}). Moreover, the subnormal period (Graham⁴) may be found in the two preparations following supernormal period (see also Ashman and Wooley⁵). The results of these experiments, thus offer further indication of the similarity in the two preparations, of the fundamental processes concerned with the recovery of electrical excitation following a response despite the very great differences in their manifest time functions.

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Relation of Muscle Receptive Substance to the Contractile Mechanism. Responses to Heat and Drugs.

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This paper reports further work in an investigation of muscle-receptive substance and contractile mechanism in smooth muscle

¹ Ashman, R., and Hafkesbring, R., *PROC. SOC. EXP. BIOL. AND MED.*, 1925, **23**, 162.

² Graham, H. T., *Am. J. Physiol.*, 1933, **104**, 216.

³ Graham, H. T., *Am. J. Physiol.*, 1934, **110**, 225.

⁴ Graham, H. T., *Am. J. Physiol.*, 1935, **111**, 452.

⁵ Ashman, R., and Wooley, E., *PROC. SOC. EXP. BIOL. AND MED.*, 1925, **23**, 159.