

SECOND PHASE HEART : THREE CONTRACTIONS. FIRST, RHYTHMIC STIMULUS ; SECOND, RHYTHMIC STIMULUS PLUS EXTRA STIMULUS 0.3 SEC. LATER ; THIRD, RHYTHMIC STIMULUS.

The block is removed in 2-3 minutes by sodium oleate 1 in 10^3 (quicker by adrenaline 1 in 10^3), as shown by gradually increasing contraction height.

The phenomenon is also seen in vagus stimulation and acetylcholine action, where it is abolished by atropine but not by sodium oleate or adrenaline. In normal hearts, it is found in those ligatured at the sino-auricular junction, but only in April-May when the vagus effect is strong. It is abolished by atropine.

It is especially prominent in hearts in the second phase of potassium removal which are flooded with potassium by turning on to Ringer solution. Here the phenomenon gradually disappears with gradually increasing contraction height, evidently by a redistribution of the extra potassium within the cell.

The phenomenon is essentially the same whether produced by flooding of the cell with potassium, or by vagus stimulation. It seems therefore that vagus stimulation causes inhibition by setting free excess potassium at some position in the cell interior, while adrenaline produces its effect by causing a more beneficial distribution of potassium.

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¹ Kanda, Z., *Arch. Exp. Path. Pharm.*, **190**, 417 (1938).

² Singh, I., Sahara, K. B., and Singh, S. I., *Curr. Sci.*, **14**, 128 (1945).

³ Donegan, J. F., *Irish J. Sci.*, 561 (1942).

Physiological Activity of a Single Follicle Occurring in an Aberrant Baboon Ovary

THE physiological activity of a single ovarian follicle is difficult to assess because assay of its fluid content does not entirely represent its functional capacity. No account is taken of the hormones within the cells of its wall. In fortuitous circumstances, an aberrant ovary containing but a single large follicle was observed in a baboon from which two complete ovaries, shown by serial section, had been removed in 1940. Subsequent oestrogen experiments, as originally reported¹, showed that a daily dose of 0.04 mgm. of oestradiol benzoate was the minimum capable of producing optimum swelling of the sex skin, previously attained by both ovaries. Although these experiments were continued for two and a half years, after the first year bleeding did not occur following the withdrawal of oestrogen in any dose whatsoever.

After a lapse of two months, the perineum began to rise spontaneously, and levels attained before castration were again reached. At laparotomy, on the ninth day of perineal swelling, but while deturgescing, a small nodule 1 cm. in diameter was removed. It was midway between the right cornu of the uterus and the fimbria of the tube on the anterior aspect of the broad ligament. This mass contained but a single follicle with a maximum diameter of 3.2 mm. Histologically, it was surrounded by irregularly distributed patches of theca lutein cells containing moderate amounts of fat. The granulosa cells lining the follicle were degenerating. The connective tissue around the latter contained many bundles of smooth muscle fibres. Endometrium removed at the same time was late proliferative and did not reflect the changes occurring in the granulosa cells.

This case provides the opportunity of recording the existence of a supernumerary ovary in the baboon, the first in our experience of more than sixty animals subjected to laparotomy. Furthermore, the existence of a single follicle in this ovary permits the conclusion that its oestrogenic activity was equivalent to 0.04 mgm. of oestradiol benzoate, the minimal amount which had previously produced normal turgescence.

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¹ Gillman, J., *Endocrin.*, **31**, 172 (1942).

Radioactive Tracers in the Study of Friction and Lubrication

WHEN one metal slides over another, a measure of the amount of metal transferred from one surface to the other will give an indication of the amount of metallic adhesion occurring during sliding. Bowden and Moore¹, using an electrographic analysis method, were able to detect quantities of copper transferred from a slider on to a platinum surface of the order of 10^{-7} gm./mm.². Using a radioactive flat surface, Sackmann, Burwell and Irvine² measured, by means of a Geiger counter, the pick-up on a small spherical slider. More detailed information has been obtained in this laboratory by using a small radioactive slider and obtaining a contact photograph of the resulting track on a flat metal surface by means of a photographic plate placed directly on it.

The friction apparatus of Bowden and Leben³ was used, and the slider consisted of lead containing a radioactive isotope from spent radon tubes. Experiments were carried out with this slider moving on steel, copper and lead surfaces when clean and when lubricated with 1 per cent stearic acid in paraffin oil. The 'auto-photographs' were obtained with exposures ranging from 24 to 96 hours.

The accompanying reproductions show enlarged prints of these tracks. Fig. 1a shows the effect of lead sliding on unlubricated steel. The motion was a series of sticks and slips with a friction coefficient (μ) of 0.40; the sticks and slips can be seen clearly. In Fig. 1b the same surfaces are lubricated, and μ has fallen to about 0.10, with

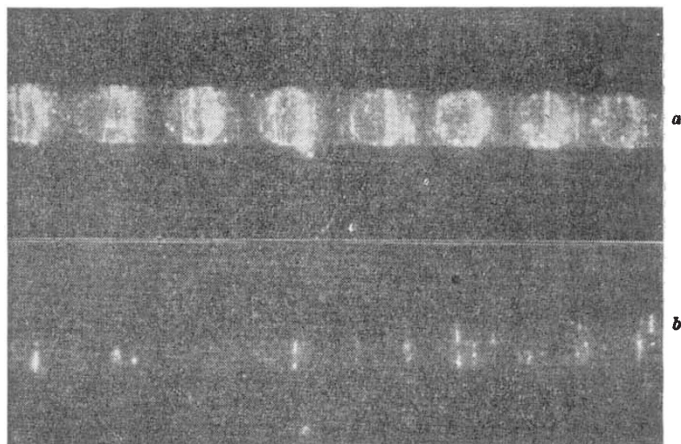


Fig. 1. $\times 6$.

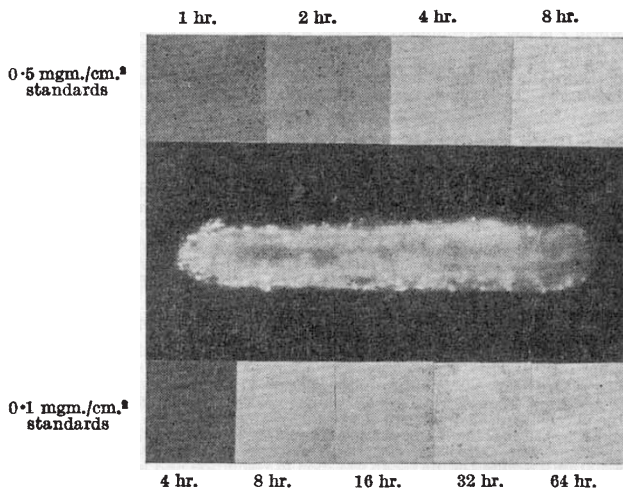


Fig. 2. $\times 6$.