marked uterine growth nor ovariectomy with subsequent castration atrophy affected the uniformity of temperatures. Epinephrine and pituitary extracts were used to produce rapid responses, but no change in uterine temperature was observed save when the body temperature exhibited a like and concomitant change.

Changes in General Body Temperature. It was found that in a cold environment the body temperature of the rat could be reduced without the aid of anesthesia as much as 45°F., below its normal level with subsequent spontaneous recovery. In all stages of this extreme drop the uterine and body temperatures continued in unison, regardless of whether the organ was in a highly vascular state as in oestrus or pregnancy, or whether it was atrophied as after ovariectomy. In environmentally produced hyperthermia this similarity of the organic and body degree of heat also persisted, even though the body heat level attained and exceeded the lethal point. Stimulation of the body by drugs to produce a febrile condition and the converse, a drug-produced loss of heat, likewise gave a similar uterine-body degree of heat.

Summary. By means of a new technique internal body temperatures were measured in intact and unanesthetized animals. The uterus of the rat was studied during physiological changes which included all stages of the oestral rhythm, pregnancy, parturition, lactation, involution, rapid uterine growth and castration. Uterine temperature was also observed at body heat levels ranging from 55° to 110°F. The temperature of the uterus was found to conform to the body (colonic) level of heat at all times. These results give no evidence for the many claims of temperature differences among the abdominal organs.

8456 P

The Electrothalamogram.*

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If one picks up the electrical potentials from subcortical ganglia in the hemispheres of the mammalian brain, rhythmic discharges

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may be recorded, as were also observed by Gerard, Marshall and Saul.[1] Yet one must bear in mind that the so-called spontaneous activity of the cerebral cortex is also manifested by bursts of more or less rhythmical waves, and that the cortex sends many centrifugal pathways to the subcortical ganglia, particularly to the optic thalamus. Thus the question presents itself as to whether the type of discharge observed on these ganglia corresponds to their own activity, also independently of the cortical influence, or whether it is due to the action of the cortex. In the present series of experiments it was tried to approach this problem in regard to the potentials led off the optic thalamus. The records of these potentials may briefly be called the electrothalamogram.

In order to obtain records of these potentials a metal cylindrical tube was screwed into a small trephine hole (diameter of the hole 7 mm.; center of the hole 8-12 mm. behind the coronal suture, 15-18 mm. laterally to the sagittal suture on the cat's skull.) This tube contained a movable hard rubber cylinder in which the electrodes could be fastened. These were concentric needle electrodes as described by Adrian and Bronk,[2] or 2 insulated silver wires with bare tips, that were coated with AgCl. The nuclei of the optic thalamus were reached in a depth of 15-19 mm. The potentials were recorded by a Sanborn string galvanometer with a 3-stage amplifier previously described.[3] All experiments were performed on cats. Post mortem the site of the electrode tips was always controlled on frontal sections.

The electrothalamogram led off the ventrolateral nuclei of the optic thalamus resembles very closely the electrencephalogram as described by Berger,[4] Adrian and Matthews,[5] Bishop and Bartley,[6] and others in that it shows 2 types of waves: slow waves (length from 90-160σ) and small, quick waves (length from 10-20σ). These waves persist in superficial ether anesthesia, in dial sleep, in bulbocapnine catalepsy, although they may be quantitatively changed. They can also be found on curarized animals with arti-

[1] Gerard, R. W., Marshall, W. H., and Saul, L. J., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 1123.

[2] Adrian and Bronk, *J. Physiol.*, 1929, **67**, 133.

[3] Spiegel, E., *Arch. Neurol. and Psych.*, 1934, **31**, 469.

[4] Berger, H., *Arch. f. Psychiatrie*, 1929, **87**, 527.

[5] Adrian, E. D., and Matthews, B. H. C., *J. Physiol.*, 1934, **81**, 440.

[6] Bishop, G. H., and Bartley, S. H., PROC. SOC. EXP. BIOL. AND MED., 1932, **29**, 698. For literature and further work on cortical potentials see also Fischer, M. H., and *Pflüger's Arch. Phys.*, 1932, **230**, 161; Kornmüller, A. E., *Fortschr. d. Neurol*, 1933, **5**, 419.

ficial respiration, and are independent of the rhythm of the respiration. They were missed in control experiments after the death of the animals. The electrothalamogram has also in common with the electrencephalogram that sensory stimuli, such as a pin prick to the foot, may diminish or even abolish the slow waves, while both types of waves persist in the cortical (Bremer[7]) and in the thalamic records, if impulses from the spinal cord and rhombencephalon are cut off by transverse section of the midbrain.

In order to eliminate the influence of corticofugal impulses, the cerebral cortex was exposed, leaving over it only a small bridge of bone with the electrode holder. The lateral surface of the cortex was then destroyed by electrocautery and the thalamic potentials were again recorded. Under these circumstances, the electrothalamogram showed also the 2 types of waves as above described. The inference may be drawn that these waves are due to the activity of the thalamic nuclei. If one considers the electric potentials as an indicator of cellular (neural) activity, the close resemblance of the electrencephalogram and of the electrothalamogram seems therefore to suggest that the activity of the optic thalamus is, at least to a certain degree, of a type similar to that of the cerebral cortex.

8457 P

Foetal Respiration in the Rabbit.

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The occurrence of intrauterine respiratory movements in the foetus has been noted[1-4] but has received scant study.

The use of the method of Snyder[5] to inhibit parturition in rabbits enabled us to make direct observations upon the full term foetus in the unopened uterus. Anesthetization of the abdominal

[7] Bremer, F., *C. R. Soc. belge de biol.*, 1935, **118**, 1235.

[1] Preyer, W., *Specielle Physiologie des Embryo.* Leipzig. Th. Grieben's Verlag, 1885.

[2] Ahlfeld, F., *Monatschr. f. Geburtsh. u. Gynäk.*, 1905, **21**, 143.

[3] Reifferscheid, K., *Deutsche Med.*, 1911, **37i**, 877.

[4] Klemperer, H. H., *Arch. f. Gynäk.*, 1933, **154**, 108.

[5] Snyder, F. F., *Bull. Johns Hopkins Hosp.*, 1934, **54**, 1.