TABLE I.
Vaginal Cornification Following Implantation of Ovarian Cultures.

Treatment of ovaries	Host animals: No. with implants	Host animals: Showing vaginal cornification %	Days from implantation to cornification: Avg	Days from implantation to cornification: Range
Direct transfer	8	100	13	6-16
Cultured 2-5 days, 37°C	20	75	14	8-24
" " " 10°C	13	76.9	13	11-17
Frozen quickly in liquid air	14	0	—	—

The results presented in Table I show that the transplanted ovarian tissue which had been maintained at 37°C or 10°C became functional, in terms of vaginal cornification, in approximately the same length of time as the tissue transplanted immediately. Ovarian tissue frozen quickly in liquid air did not produce vaginal cornification during 50 days of observation. Vaginal smears characteristic of estrus were observed in approximately 75% of the animals receiving ovaries maintained both at 37°C and at 10°C, whereas all of the animals receiving ovarian tissue implanted immediately after removal from the animal showed such smears.

The practicability of the test for endocrine function has been demonstrated for ovarian tissue and it is probable that it will be applicable to small pieces of any of the endocrine organs. The anterior chamber of the eye is easily accessible for implantation, observation, and graft removal, and provides an adequate blood supply with relatively little pressure or congestion.

Summary. A method has been described for testing the endocrine function of ovarian tissue after growth in culture at 37°C or storage at 10°C. Such tissue, when transplanted into the anterior chamber of the eyes of castrate female rats, after a latent period of from 8 to 24 days, produced typical estrous type of vaginal smears which compared favorably with the effects produced by transplants made directly after the removal of the tissue from the donor animal. Ovarian tissue frozen quickly in liquid air failed to produce cornification of the vaginal epithelium.

13890

External Field of the Nerve Impulse.

J. A. GENGERELLI.
From the University of California at Los Angeles.

Since the time of Hermann,[1] the conception of the nerve impulse as a self-propagating electric stimulus has become more and more widely accepted. Within the last few years several experiments have been reported purporting to test the consequences of this view of the impulse as an electrical circuit with two longitudinal resistive components (the transverse ones do not concern us here), one within the core of the axon itself, the other existing outside the core and involving the surrounding media.[2-4]

An additional possible consequence of the local circuit theory concerns the electro-

1 Hermann, L., *Pflüger's Arch.*, 1899, **75**, 574.

2 Hodgkin, A. L., *J. Physiol.*, 1939, **94**, 510.

3 Katz, B., and Schmitt, O. H., *J. Physiol.*, 1939, **96**, 9P-10P.

4 Katz, B., and Schmitt, O. H., *J. Physiol.*, 1940, **97**, 471.

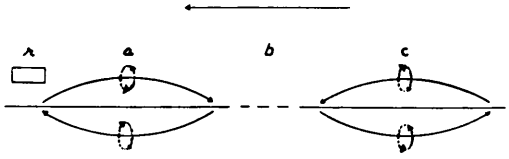

FIG. 1.
r represents cross-section of a toroidal coil.

magnetic properties of the field surrounding the region occupied by the advancing impulse. If the theory is true, the magnetic field surrounding the external component of the circuit should be oriented in a manner which is opposed to that of the internal component, with the result that, owing to the extreme smallness of the core's diameter, almost complete cancellation of the magnetic fields will result. (Fig. 1). If, therefore, a suitable detecting instrument is placed outside the nerve itself, no magnetic field should be observed.

Apparatus. The detecting instrument was a toroidal coil made of thirty turns of No. 28 wire wound longitudinally about a cylindrical core made of a stack of Numetal plates with a 3/32″ hole through the center. The coil was 1 cm long. This was imbedded in a "Lucite" cylinder (2 cm in diameter) and carefully insulated with "Amphenol dope" in such wise that there could be no leakage between the contents within the aperture and the wire. The coil was tested for electrical leakage before and after each experiment. The coil leads were inducted into a matching transformer whose output was fed into an amplifier, unbalanced to ground. The recording instrument was a commercial Dumont oscillograph.

By means of this arrangement (Fig. 2) it was possible to use the toroidal coil as a magnetic detecting device. By grounding the primary of the transformer, any purely electrical coupling between the toroid and the recording instrument would be obviated and hence any disturbance transmitted to the oscillograph would indicate an induced EMF in the pick-up coil.

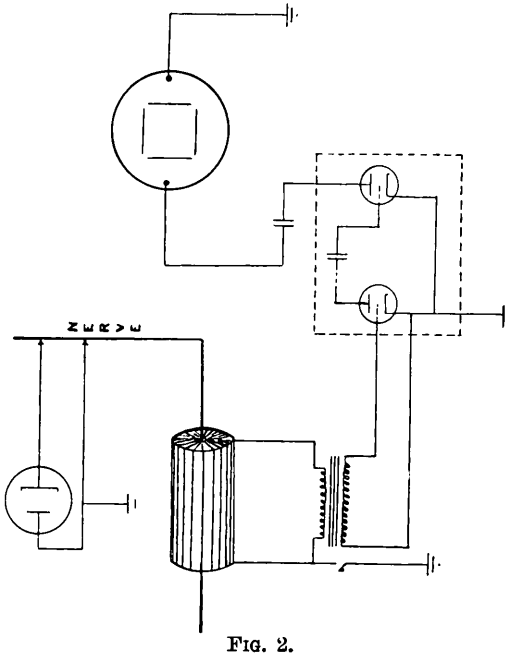

FIG. 2.

The pick-up system possessed a sensitivity permitting the detection of the magnetic field of a .10 μ A current at 500 cycles sent through the center of the coil.

The frog's sciatic was used.

Results. Many repetitions of the experiment gave negative results.

Experiments were performed wherein the nerve preparation and the toroidal coil were submerged in saline solution. In this case, the conductive saline solution surrounding the nerve could be expected to act as a low resistance shunt (Hodgkin), drawing off a portion of the external component of the bioelectric current and thus provide for a greater physical separation between the internal path of the current and a portion of the external path. This would have the effect of diminishing in some degree the interaction between the oppositely oriented magnetic fields.

The results in this case, however, were also negative.