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Some Effects of Denervation on Muscular Contraction.

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The effect of denervation on contraction of the gastrocnemius of the frog was observed by recording, simultaneously, the myograms of the intact and denervated muscle. Denervation was accomplished by excising 5 to 8 mm. of sciatic nerve from one leg (7 to 21 days prior to the experiment). Thirty experiments were made on winter frogs (*Rana pipiens*). A gastrocnemius-sciatic preparation was made from the left (operated) and right (intact) legs. Both preparations were then mounted in such a way that the intact nerve-muscle and its writing lever were directly below the denervated muscle and in alignment with its writing lever. The muscles were stimulated by a maximal tetanus, simultaneously, through their nerves, by means of a Harvard inductorium. Stimulation was either by a switch, operated by hand or, when recurrent automatic stimulation was desired, by means of a switch placed on the kymograph and operated by its rotation. An electromagnetic signal placed in the primary circuit and arranged to write upon the drum in alignment with the two muscle levers, recorded the number and duration of the stimulations.

The myograms of denervated muscle present certain peculiar differences from those of normal muscle. The initial speed of contraction as indicated by the steepness of ascent of the lever, is greater in denervated than in intact muscle. All of the records agree in this particular. This speed factor should result in a diminished latent period for the denervated muscle. In these experiments, however, the technique was not sufficiently refined to demonstrate this difference. The relaxation phase also takes place more quickly than in the intact muscle. The difference is especially marked at the end of the relaxation phase. There appears also to be a shortening of the intermediate phase, or crest of the myogram, although this fact is less easy to demonstrate than the other two. The total duration of the myogram is, therefore, considerably less in

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the denervated than in the normal muscle. Staircase phenomenon is marked in the intact muscle and is usually absent or very slight in the denervated muscle.

The experiments permit the suggestion that these changes may be due to altered viscosity of the denervated muscle. J. F. Fulton¹ has proposed a similar explanation on the ground of the diminished tension and the increased area of the myograms showing the staircase effect.

Further investigation of these changes in muscle, on frogs and cats, is in progress. Preliminary observations on cats, in which the left sciatic was sectioned, indicate that the elasticity of the denervated muscle, as measured by the stretch produced by equal increments of load, is less than that of intact muscle subjected to the same experimental conditions.

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**Production of a Premenstrual Endometrium in Castrated Monkeys
by Ovarian Hormones.***

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The several theories explaining menstrual phenomena in primates for the most part agree that it depends upon hormonal function of the ovaries. Some authors emphasize follicular hormone, some corpus luteum, while others believe that both are concerned. Van Herwerden¹ found that in *Cercocebus cynomolgus* menstruation may occur without ovulation and Corner² and Allen³ have established the same fact for *Macacus rhesus*. Allen also discovered that rather scanty menstruation in castrate and sexually immature monkeys usually followed after a certain degree of uterine growth had been induced by the injection of follicular hormone. These authors agree, however, that the uterine endometrium under these conditions is not typical of the normal premenstrual endometrium found only

¹ Fulton, J. F., "Muscular Contraction and the Reflex Control of Movement," 1926, 252.

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¹ Van Herwerden, M., *Monatschr. f. Geburts u. Gynaek.*, 1906, xxiv, 730.

² Corner, G. W., *Contributions to Embryology*, 1923, No. 332, 75.

³ Allen, E., *Contributions to Embryology*, 1927, xix, No. 380, 1.