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The Complexity of the Achilles and Patellar Tendon Reflex Arcs.

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The concept that the highest neurological levels are functional parts of the peripheral arcs is becoming more and more widely accepted. Of special importance for this concept is the work of Hoffmann,¹ Travis and Dorsey,^{2, 3} Herren and Haterius,⁴ and Coghill.⁵ Hoffmann and Travis and Dorsey found that both anatomical and physiological alterations of the higher nerve centers alter reflex time in humans. Herren and Haterius found that functional changes in the higher nerve centers of the rat produce changes in the reflex time. All of these workers used the action current technique for measuring the reflex response latency. Further experiments in which this same technique was utilized furnish additional evidence for the proposition that the highest levels of irradiation are functional parts of the lowest levels of irradiation.

In the first study patellar reflex records were secured on 122 and Achilles reflex records on 119 normal adults. The reflex time in both reflexes regularly correlates higher with standing height than with measures that should more closely approximate the true lengths of the peripheral arcs.

A second study shows that during severe tonic blocks in stuttering the patellar reflex time is reduced, whereas in the normal speech of both stutterers and normal speakers it is not affected. The reductions in 8 severe cases varied from 10 to 50% of the reflex time

¹ Hoffmann, F. A., *Deutsch. Arch. f. Klin. Med.*, 1916, *cxx*, 173.

² Travis, L. E., and Dorsey, J. M., *Arch. Neurol. and Psychiat.*, 1929, *xxi*, 613.

³ Travis, L. E., and Dorsey, J. M., *Arch. Neurol. and Psychiat.*, 1929, *xxii*, 99.

⁴ Herren, R. Y., and Haterius, H. O., *PROC. SOC. EXP. BIOL. AND MED.*, 1929, *xxvi*, 657.

⁵ Coghill, G. E., *Arch. Neurol. and Psychiat.*, 1929, *xxi*, 989.

during silence. There appears to be some relationship between the severity of the block and the amount of reduction of the reflex time.

A third study shows that alcohol decreases the patellar reflex time in dogs. In general each of 5 dogs ranging in weights from 31 to 37 pounds was given intravenously rapidly 20 cc. of 97% alcohol in 80 cc. of normal salt solution. The reflex times of each dog were consistently but irregularly shortened after the alcohol injection. In addition the ranges of reflex time were greater. The reductions in reflex time varied from 6 to 30% of that of the normal period.

All of these findings indicate that the nerve impulse in these reflexes may travel beyond the cord to certain higher nerve centers or at least that the higher centers are a functional part of the lower and that an alteration of the functions of the former alters prejudicially the functions of the latter.

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The Effect of Submersion in Water at Various Temperatures On Respiration.

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The data herein presented include only a part of an investigation of the disturbances in respiration due to submersion in water of various temperatures.

Wasserman,¹ Bazett,² and Hill and Flack³ made observations on the effect of bath temperature changes on respiration, but we have failed to find a complete picture, beginning with cold and ending with hot water. However, the results reported by these investigators parallel our findings.

In securing the data, use was made of the constant temperature baths provided by the Psychopathic Hospital. Each subject was placed in the tub in a prone position during which time a record of normal respiration was taken. Following this the tub was filled, temperature changes made and data recorded as indicated by Fig. 1. Time is recorded in 5 sec. intervals.

¹ Wasserman, Max., *Casopis ceskych lekaru*, 1924, Nos. 16, 19. (Quoted from *Archiv. des Maladies, du coeur des Vaisseaux et du Sang.*, 1926, 50.)

² Bazett, H. C., *Am. J. Physiol.*, 1924, lxx, 412.

³ Hill, L., and Flack, M., *Fr. Physiol.*, 1908, 38, *Proc. Physiol. Soc.*, lvii.