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Some Effects of Physical Fatigue on Peripheral Circulation in Athletes.

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This investigation was prompted by suggestions resulting from observations on the high incidence of recurrent attacks of malaria and predisposition to upper respiratory infections following fatigue. The possible suggestion arose that there might be an effect upon the peripheral circulation to which a clue could be obtained by a study of the blood picture. An earlier report by Hastings on the physiology of fatigue¹ called attention to the fact that following long continued exercise the resistance of erythrocytes to laking increased "at a diminishing rate," but there are no conclusions regarding the condition or proportion of white cells in his study. It was decided to carry on this study on subjects who had exercised until they were greatly fatigued and compare the results of study of the blood picture during this period with the normal blood picture before exercise and with that following recovery from fatigue.

Microscopic studies were made on blood smears, stained with Wright's stain, at intervals before and during the recovery period following fatigue as follows: preliminary examination before exercise, immediately after exercise, and at intervals of one-half hour, one hour and 2 hours after exercise. Forty male volunteers from the various athletic teams and classes were used in this study. A study of the results of the examination of these slides has been tabulated in Table I.

TABLE I.
Relative Change in the Proportion of Cells on the Basis of a Count of 100 White Cells.

| Results | Type of cell | | | | | | | |
|-----------------------------------------------|--------------|----|-------------------|----|-------------------|----|-------------------|----|
| | Polymorphs | | Large lymphocytes | | Small lymphocytes | | Total lymphocytes | |
| | No. of Cases | % | No. of Cases | % | No. of Cases | % | No. of Cases | % |
| | | | | | | | | |
| Relative significant increase (5% or greater) | 2 | 5 | 26 | 65 | 12 | 30 | 28 | 70 |
| No significant change (less than 5%) | 12 | 30 | 10 | 25 | 24 | 60 | 9 | 23 |
| Relative significant decrease (5% or greater) | 26 | 65 | 4 | 10 | 4 | 10 | 3 | 7 |

¹ Hastings, Albert B., *U. S. Public Health Bulletin* 117, May, 1931.

The distribution of monocytes, eosinophiles, and basophiles did not vary significantly.

Discussion. From the study of the tabulations it appears that, contrary to expectations, there was an immediate decrease in the relative number of polymorphs in more than one-half of the cases studied immediately after exercise or at the onset of the fatigue phase. Among the lymphocytes the greatest change appears as a relative increase in numbers of large lymphocytes as well as a significant relative increase in the total lymphocytes in more than one-half of the cases studied.

It appears that at the onset of the fatigue phase there is a significant lymphocytosis suggestive of an "irritation phenomenon" such as is frequently found in infections or other depleting conditions.

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Location of Inhibitory Respiratory Center in Cerebral Cortex of the Dog.

PERCIVAL BAILEY AND WALTER HAYNES. (Introduced by Arthur Weil.)

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There is considerable discrepancy in the literature concerning the location of the inhibitory respiratory center in the cerebral cortex of the dog. Spencer¹ originally located it in the allocortex, medial to the sulcus rhinalis. Bucy and Case² located it just below the anterior extremity of the coronal sulcus and Smith³ farther posteriorly in the gyrus compositus anterior. Because of this uncertainty we have repeated these experiments using the technic of Bailey and Sweet⁴ which, by exenteration of the orbit, permits access to the entire orbital region of the frontal lobe without the necessity of retracting the brain. Under these circumstances, using either ether or nembutal for light anesthesia, the inhibitory respiratory region is found to be a very small area situated in the gyrus compositus anterior just lateral to the posterior extremity of the gyrus proneus. It is definitely lateral to the sulcus rhinalis and sulcus supraorbitalis.

¹ Spencer, W. G., *Philos. Trans.*, 1894, B **185**, 609.

² Bucy, P. C., and Case, T. J., *J. Nerv. and Ment. Dis.*, 1936, **84**, 156.

³ Smith, W. K., *J. Neurophysiol.*, 1938, **1**, 55.

⁴ Bailey, P., and Sweet, W. H., *J. Neurophysiol.*, 1940, **3**, 276.