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Effect on Costal Respiratory Movements of Division of the Phrenics Following Transection of the Midbrain.*

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It has been shown that section of the dorsal roots of the thoracic nerves is followed by cessation of costal respiratory movements which are promptly resumed if the phrenics are excised, the vagi and midbrain being intact.[1] (The effect of section of the dorsal roots is somewhat greater when the cervical as well as the thoracic roots are sectioned.[2])

Section of the midbrain alone at the level of the inferior colliculi is followed by a diminution of costal movements and the rate of respiration is somewhat slowed, but remains regular.

The question arises therefore whether section of the phrenics would have the same effect on costal respiration after section of the midbrain as after section of the dorsal roots of the thoracic nerves. The observed effects of division of the phrenics subsequent to transection of the midbrain in 30 cats are:

1. An increase in the depth of the costal respiratory movements, which is to be expected.

2. The respiratory rhythm immediately becomes irregular. There may be pauses of 5 to 10 seconds followed by from 5 to 10 costal movements and a succeeding pause. In some cases the tendency to grouping is slight. The character of the individual movements may vary. Sometimes there may be a rapid abrupt inspiratory movement followed without pause by an equally abrupt expiratory movement with a rhythm of 10 to 12 a minute. A series of from one to 3 small inspiratory movements may precede the actual large abrupt inspiration. When the group character is more pronounced, the inspiration is not so abrupt and expiration follows after a more appreciable interval.

So long as the vagi are intact, section of the dorsal roots of the phrenics, following transection of the midbrain does not elicit irregular respiration. Irregularity appearing after division of the phrenics is not due merely to elimination of afferent impulses. It would

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[1] Pike, F. H., and Coombs, H. C., *Science*, 1922, **56**, 691.

[2] Coombs, H. C., PROC. SOC. EXP. BIOL. AND MED., 1929, **27**, 196.

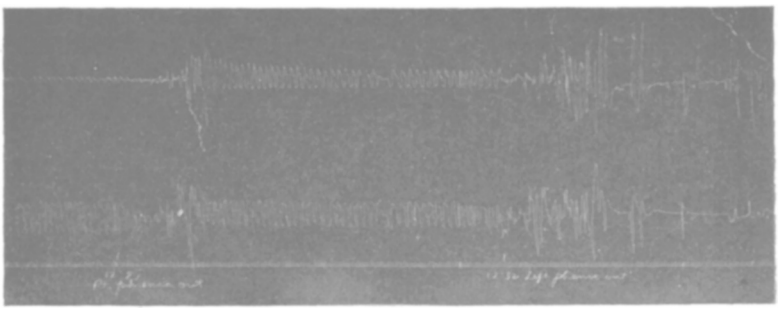

FIG. 1.
The upper tracing is of costal, the lower, of diaphragmatic, respiration. The figure shows respiration after division of the posterior *corpora quadrigemina*, followed by excision of both phrenics.

appear that the vagus which under the conditions of the experiments here recorded is the only afferent mechanism from the respiratory tract and muscles to remain uninjured, has a closer relationship to the control of diaphragmatic movements than it has to the control of costal movements.

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Total Erythrocyte and Leucocyte Counts in Pregnant and Non-Pregnant Albino Rats.

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Crosman[1] recently stated that the average leucocyte count of the pregnant albino rat is approximately 7,000 to 10,000 higher than that of non-pregnant animals. Comparison with our data on pregnant and non-pregnant rats respectively, shows that there is such great fluctuation in the counts of individual rats that only averages from a long series are significant in this regard. Our average count for the leucocytes of the pregnant female rat throughout the last third of pregnancy (16 to 22 days) is 10,758 per cu. mm. of blood as against 12,372 for our non-pregnant animals. (Table I.) These results suggest a decrease in the average count of the leucocytes during the last third of pregnancy. Certainly no leucocyte increase occurs. A high peak appears in one maternal count at the time when

[1] Crosman, A. M., *Anat. Rec.*, 1930, **45**, 259.