

administered under conditions of constant ventilation as well as normal variable ventilation.

It was found that low alveolar oxygen during constant pulmonary ventilation augmented the reflex response of the anterior tibialis muscle similar to that during normally augmented ventilation.

To determine the site of action of low oxygen pressure, both anterior tibialis muscles were isolated and stimulated, one reflexly as above and the other through its severed motor nerve. In the 4 experiments that were done it was found that the response to the direct stimulation of the motor nerve was the same as the reflex response. Whether the change in reflex response is due entirely to the action of low oxygen pressure on the motor end of the reflex arc remains to be determined.

4539

III. Varying Degrees of Ventilation and Response of Anterior Tibialis Muscle to Reflex and Motor Nerve Stimulation.

HAROLD H. GAY. (Introduced by Robert Gesell.)

From the Department of Physiology, University of Michigan.

Seventeen experiments were performed in which carbon dioxide mixtures were administered by artificial ventilation. In 11 of these the carbon dioxide percentage was successively increased from 5 to 25%. In 15, ventilation with pure oxygen was varied from under ventilation to over ventilation, thus permitting large fluctuations in alveolar carbon dioxide pressure without undue lowering of alveolar oxygen pressure.

Carbon dioxide reduced the reflex response of the anterior tibialis muscle in all but one experiment. It reduced nerve-muscle response in all but 5 of the 17 experiments. In some experiments even high carbon dioxide mixtures did not depress the motor nerve response, whereas the reflex response was decreased.

Under ventilation in oxygen reduced reflexes in all but 2 experiments. It reduced nerve-muscle responses in all but 8 of the 17 experiments. Pure oxygen never failed to restore reflexes after carbon dioxide in pure oxygen had reduced them. Over ventilation always restored reflexes after they had been depressed by under ventilation in pure oxygen. Pure oxygen occasionally caused hyper-tonus, particularly in the muscle with the nerve intact, and on 3 occasions in the other muscle as well. Where pure oxygen was administered after room air the reflex response frequently fell off somewhat.