

This conception of the fundamental mechanism of anaphylaxis tends to unify anaphylactic phenomena in different animal species. The dominant clinical manifestations in different species would depend upon the relative anaphylactic susceptibility of the capillary endothelium in these species, with the resulting promptness and completeness with which atypical chemical products are brought into contact with the secondary tissues.

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An experimental study of the effect of stenosis upon the respiratory changes induced by muscular exercise.

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Dyspnea from muscular exercise results when the increased respiratory demands can no longer be met without effort. In the present series of experiments the ability to meet these demands was artificially restricted by having a normal individual (A. W. H.) breathe through small apertures. For this purpose two perforated corks were used, the diameters of the bores being 8 mm. and 6 mm. respectively. The first of these caused no effort so long as the subject of the experiments was at rest. It caused moderate respiratory effort when stairs were climbed at the rate of approximately 80 per minute. The second caused slight effort at rest and considerable distress during stair climbing. The latter culminated in discontinuance of the exercise after two or three minutes.

During rest, the respiratory rate was not influenced by the milder obstruction but in some experiments was somewhat slowed by the more marked obstruction. During exercise, the respiratory rate was definitely slowed by each, average figures being: without stenosis 27 respirations per minute, with 8 mm. stenosis 21 respirations per minute, and with 6 mm. stenosis 17 respirations per minute.

During rest, the minute volume of respiration was not altered by the lesser stenosis but in some experiments became somewhat

less with the more marked stenosis. During exercise, the minute volume was regularly reduced. After one to three minutes of exercise pulmonary ventilation became approximately constant at the following levels: without stenosis 52 liters per minute, with 8 mm. stenosis 46 liters per minute, and with 6 mm. stenosis 28 liters per minute. With the more marked obstruction, stair climbing had to be discontinued after 2 to 3 minutes on account of increasing distress. With the less marked obstruction this was not the case. Compensation for the restricted ventilation was here accomplished by increasing the percentage of O_2 absorbed from and of CO_2 given off to the respired air.

Comparative observations of the respiratory activities were made during and shortly after the ascent of 100 steps. Pulmonary ventilation during the one and a quarter minutes of this exercise became less as the obstruction increased; yet the ventilation immediately after the exercise showed no significant alteration as a result of the obstruction. The CO_2 output during the exercise was progressively diminished by the obstructions, the excess being eliminated during the first few minutes of recovery. The oxygen absorption was not appreciably influenced by the lesser obstruction but it was reduced during exercise by the more marked obstruction, the relative deficit being made up during the first two minutes of recovery.

In these experiments degrees of stenosis were used which produced little or not effect during rest but caused both subjective and objective disturbances of respiration during exercise. The most constant objective effects of stenosis were the relatively slower respiratory rate and the relatively smaller pulmonary ventilation when exercise was taken. During a short period of exercise there was a lessened output of CO_2 and in the case of the more severe obstruction a lessened absorption of oxygen, which changes were equalized during the first few minutes of recovery. Where prolonged exercise could be tolerated, compensation for the reduced volume of ventilation was effected by increasing the percentages of O_2 absorbed and of CO_2 eliminated. The pulmonary ventilation during recovery from short periods of exercise gave no indication of the degree of stenosis or of the subjective dyspnea.