following subdural administration of epinephrine and an anesthetic. Method: Epinephrine hydrochloride (0.3 to 0.75 mg.) in combination with tetracaine hydrochloride (3 mg./kg.) was injected intrathecally into male gray chinchilla rabbits according to the method of Bieter et al. as modified by Luduena. Loss of the urethral reflex, motor paralysis and sensory loss of the hind limbs was immediate. The duration of anesthesia was 18 hours with complete recovery following the tetracaine-epinephrine combination. Intrathecal injection of epinephrine alone in the same concentration as above produced an almost immediate total body convolution, opisthotonus, and grunting respirations lasting about ten minutes. Anesthesia, with epinephrine lasted 40 minutes with full recovery. Fourteen days after the intrathecal injections, the rabbits were killed and their spinal cords removed. Results: Histological examination of spinal cords from rabbits who had received epinephrine alone or in combination with tetracaine demonstrated similar changes, which consisted of slight degeneration of myelin sheaths in the posterior columns bilaterally, and chromatolytic changes in the anterior horn cells of the gray matter. These findings were observed predominantly in the lumbo-sacral and lumbar segments, but were also found as high as the lower thoracic segments. The control group of animals, which received an intrathecal injection of 0.9 per cent sodium chloride solution only or had no procedures performed upon them, demonstrated a similar histological pattern. Conclusions: The results of this study indicate that neither epinephrine alone nor epinephrine in combination with tetracaine produced any persistent histopathological changes in rabbit spinal cord.

Oxygen Consumption and Blood Gas Exchange During Controlled and Spontaneous Ventilation in Patients With Respiratory Failure. P. R. Berry, M.D. and H. Pontoppidan, M.D., Respiratory Unit and Anesthesia Laboratories, Harvard Medical School at the Massachusetts General Hospital, Boston, Mass. The physiological differences in patients undergoing controlled respiration for respiratory failure and those breathing spontaneously are of importance for evaluation of the effects of controlled ventilation. (Grenvik, A.: Acta Anaesth. Scandinav. Suppl. XIX: 1966.) A decrease in total oxygen consumption has been reported following the institution of controlled ventilation in patients attempting to breathe spontaneously (Dammann, J. F.: Ann. N. Y. Acad. Sci. 121: 849, 1965). The explanation offered is that controlled ventilation reduces the work of breathing and that a considerable proportion of the total oxygen consumption is expended in the work of breathing.

Method: Patients in the weaning stage from prolonged controlled ventilation are suitable subjects for studying the changes in oxygen consumption and other ventilatory parameters after changing the mode of ventilation. Six such patients were studied. Ventilation was controlled by using either volume- or pressure-limited ventilators (Emerson Postoperative Ventilator; Bird Mark VII Ventilator). The inspired gas concentration was the same during controlled as it was during spontaneous ventilation (48-50 per cent). During spontaneous ventilation the patient breathed via one way valves from a low-pressure reservoir bag. Synchronous collection of expired gas (3-minute sample) and arterial blood was made. $F_{O_2}$ and $F_{CO_2}$, pH, $P_{CO_2}$, and $P_{O_2}$ were measured. Respiratory gas-exchange ratios, oxygen consumption ratios, alveolar-arterial oxygen tension difference and physiologic dead space were calculated from the data. Results: In all patients the $P_{ACO_2}$ increased (16, 4, 10, 1, 3, 9; mean 8 mm. Hg) during spontaneous ventilation whereas the ratio of physiologic dead space to tidal volume remained unchanged (+0.15, -0.04, +0.05, +0.05, -0.08, +0.01, -0.04). The alveolar-arterial oxygen tension difference increased on an overall average of 25 mm. Hg despite the facts that in two patients a small decrease was seen (44, -3, +33, +21, +30, -1, +54). There were large variations in the changes in oxygen consumption between spontaneous and controlled ventilation when referred to controlled ventilation. Some patients showed a decrease in oxygen consumption on spontaneous ventilation whereas others showed an increase (-25 per cent, +5 per cent, +2 per cent, +60 per cent, -10 per cent, -32 per cent, -12 per cent).