Effects of Halothane on Mechanical Properties of Heart Muscle. ALAN H. GOLDBERG, M.D., Ph.D., and WILLIAM C. ULRICK, Ph.D., Anesthesia Research Laboratory, Department of Anestheticsiology and Department of Physiology, Boston University School of Medicine, Boston. Method: The effects of halothane on isometric tension produced by isolated heart muscle were observed in 102 experiments from 58 rat heart preparations. Following decapitation of each rat, a column of trabecula carneae muscle was dissected from the posterior wall of the left ventricle and suspended between two clamps in a bath of oxygenated Ringer’s solution maintained at 25° C. Each preparation was induced to contract isometrically once every two seconds by a threshold intensity square wave pulse of 6 msec. duration. Tension was measured by a Statham strain gauge attached to the upper muscle clamp by a brass rod. The amplified output of this strain gauge was recorded on a direct writing oscillograph. Muscle length was measured directly by a telescopic sight. Comparisons were made between data obtained during administration of 100 per cent O₂ and after 0.10, 0.40, 0.85, 1.65 or 2.35 per cent halothane was added to the O₂ supply for 90 minutes. The 1.65 per cent concentration was also studied at 37.5° C. Results: At 25° C. (90 experiments), both peak developed tension and maximum rate of tension development were reduced (9.86 to 52.84 per cent and 14.94 to 56.91 per cent, respectively) in direct proportion to the concentration of halothane administered. Time to peak tension and total twitch duration were reduced slightly (maximum changes 3.43 and 5.40 per cent, respectively). Resting tension was reduced (6.78 per cent) only by the highest halothane concentration. Depression in peak developed tension was significantly correlated with halothane concentration and reduction in rate of tension development but not with changes in the time to peak tension. Relaxation time and muscle length were not altered. In recovery from halothane the effect was essentially complete following change of the Ringer’s solution and 60 minutes of 100 per cent O₂. Similar data were obtained at 37.5° C. (12 experiments). Summary: The results of this study demonstrate a direct effect of halothane on heart muscle apart from any circulatory or nervous influences. Because the decreased peak isometric tension was coupled with a parallel and proportional alteration in the rate of rise of tension, it appears that halothane exerts its cardiac effects primarily by depressing the intensity of the active state of the contractile elements of heart muscle. Since this effect was demonstrated with concentrations of halothane used clinically, this decreased active state intensity could be at least partially responsible for the hypotension associated with the use of halothane anesthesia. (Supported in part by P.H.S. Grants HE-07644-03, FR-05380-04 and FR-05487-03.)

Absorption of Carbon Dioxide: Influence of Canister Design on Performance Characteristics of Commercial Absorbers. LOUIS J. HAMPTON, M.D., Hanover General Hospital, Hanover, Pennsylvania. This study was made to determine whether reliance on progression of color change in the absorbent can be used to prevent carbon dioxide leakage in several commercial absorbers. Method: A mechanically ventilated closed circle system was employed in which carbon dioxide input was 300 ml./minute, tidal volume was 500 ml., and the ventilatory rate 15 per minute. Leakage of carbon dioxide was detected with a Beckman infra-red analyzer and displayed on a Texas Recti-riter. Two classes of determinations were made where feasible: (1) time required to produce carbon dioxide leakage through the upper canister with notation of level of color change at which leakage occurred, and (2) percentage of leakage when the color change had progressed to the baffle separating upper and lower compartments. Color photographs were used to record levels of color change and to describe channeling. The absorbent was Baralyme unless otherwise noted. Tests were conducted on the Roswell-Park, Ohio Model 20-21 and the Foregger Jumbo absorbers, and on the Dewey and Almy Pre-pak (Sodasorb) and a new disposable canister developed by the National Cylinder Gas Company. Results: Roswell-Park: 3 tests; leakage through upper compartment in