Studies on Adrenal Medullary Discharge Under Halothane Anesthesia. R. W. Cardier, Ph.D., A. B. Richards, B.S., and V. K. Stoeckling, M.D., Departments of Anesthesiology and Pharmacology, Indiana University School of Medicine, Indianapolis, Indiana. Ravnits demonstrated (Brit. J. Pharmacol. 11: 395, 1956) that halothane reversed the pressor (nicotinic) response to large doses of acetylcholine in atropinized dogs, and depressed the increase in blood pressure due to splanchnic nerve stimulation. It has been shown that N, N-diisopropyl N'-isomyyl N'-diethylaminoethyl urea (P-280) produces similar effects by specific blockade at the adrenal medulla (Cardier, R. W., Abreu, B. E., Richard, A. B., and Herrlich, H. C., J. Pharmacol. Exp. Ther. 130: 340, 1960). Therefore, it became of interest to investigate the mechanism of the acetylcholine pressor reversal under halothane anesthesia. Method: Femoral arterial pressure was measured with a Statham transducer and recorded, along with lead II electrocardiograms, on a Grass polygraph. Cardiac output was determined by the dye dilution technique (Hamilton, W. F., and others: Amer. J. Physiol. 99: 534, 1932). Continuous blood glucose recordings on antibrachial venous blood were made with a Technicon Auto-Analyzer. Anesthesia was induced in all animals with methohexitol, intravenously. Each was intubated with auffed Magill endotracheal tube. When it was necessary to obtain responses in the absence of halothane, the animals were maintained on a constant infusion of the barbiturate. Following recovery to stage II, the dogs were anesthetized with halothane and oxygen using the Forreger F-9 animal apparatus with a semiclosed system. Results: The "nicotinic" action of acetylcholine in the atropinized animal is characterized by an early transient pressor effect followed by a slight fall and then a prolonged rise. The secondary rise presumably is of adreno-medullary origin. Light halothane anesthesia reduced the initial rise in pressure without altering the secondary rise. However, during the latter response the increment in cardiac output was smaller than is usually observed without halothane. Peripheral resistance, at this time, was increased. Deep halothane anesthesia per se resulted in a 50 per cent reduction in cardiac output and an 11 per cent decrease in peripheral resistance. Subsequent challenge with acetylcholine resulted in a reversal of the initial pressor effect and a marked depression of the secondary hypertension. The blood pressure alterations were determined by changes in peripheral resistance since the increases in cardiac output were negligible. Comment: Any level of halothane anesthesia was without effect on acetylcholine-induced hyperglycemia. Thus it appears that halothane does not exert a blockade at the adrenal medulla and the results of Ravnits probably were due to the inability of the heart to respond to epinephrine liberated from the adrenal medulla. Furthermore, the decreased peripheral resistance from halothane alone as well as during the reversal of the initial pressor response from acetylcholine is suggestive of some slight ganglionic blockade possibly limited to the splanchnic area.

Disposal of Carbon Dioxide from Apparatus Used for Inhalational Anesthesia. Gordon Gates, M.D., and John Adrian, M.D., Department of Anesthesia, Charity Hospital of Louisiana at New Orleans, Louisiana. Regardless of the technique employed, some carbon dioxide is rebreathed from all types of inhalers used for inhalational anesthesia. Method: The problem was studied using a mechanical ventilator consisting of two bellows, one of which discharges into the inhaler, a mixture of gases containing a CO₂ content comparable to exhaled air at a volume and rate simulating actual conditions of breathing. A second bellows drew an equal volume of gases from the inhaler, which represents the inspired gas were a patient breathing from the apparatus, and was passed through an infrared CO₂ analyzer and out of the system. Results: The placement of any enclosure about the face causes some degree of rebreathing. With an uncovered Yankauer mask, the CO₂ rebreathed was 0.3 per cent. With 8 layers of gauze it ranged between 0.6-0.8 per cent. It increased progressively as gauze was added. With 20 layers it was 1.1 per cent. Flowing oxygen at rates varying from 1/2 to 10 liters per minute through a catheter placed beneath the mask did not significantly reduce the quantity rebreathed. The amount from a solid-walled face piece of 100 cc. capacity connected