Acid-Base Balance in Infants During Halothane Anesthesia with an Adult Circle Absorption System. THOMAS D. GRAFF, M.D., ROBERT S. HOLZMAN, B.A., DONALD W. BENSON, M.D., Ph.D., *Division of Anesthesiology, The Johns Hopkins Hospital, Baltimore, Maryland.* This study was designed to demonstrate the manner and the degree to which acid-base balance is altered in small infants receiving halothane anesthesia by means of an adult circle absorption system. *Method:* Infants 2 weeks to 7 months of age were the subjects of the study. In 8 infants, following induction of anesthesia and insertion of an endotracheal catheter, the anesthetic course was divided into four 15-minute periods. The technique of maintenance was alternated between an adult circle semiclosed absorption system with unidirectional valves in the head piece and an insufflation arrangement through an Ayre's T-piece. A 5-liter total gas flow was used in both of the techniques. Respirations were spontaneous throughout the hour study period. In one patient the adult circle system was used during the entire hour period and respirations were assisted three to four times a minute. In another infant, undergoing a ventriculo-atrial shunt for hydrocephalus, the adult circle system was used during a three-hour anesthesia course without benefit of assistance to respirations. In addition to the routine monitoring of blood pressure, pulse and body temperature, acid-base values, including *p*H, P_{CO_2}, and standard bicarbonate, were determined at 15-minute intervals. *Results:* In the 8 infants, where the technique of administration of the anesthesia was alternated, there was no significant difference in the two techniques with respect to the acid-base determination regardless of the level of anesthesia. A mild respiratory alkalosis developed in the infant who had his respirations assisted by means of the adult circle absorption system. The infant who was allowed to breathe spontaneously on the adult machine during a three-hour anesthesia course developed a mild respiratory acidosis with a *p*H of 7.32 and a P_{CO_2} of 51 mm. of mercury. *Discussion:* The objections to the use of the adult circle absorption system in small children is based largely on the belief that it adds excessively to the airway resistance and to the external dead space. The peak inspiratory flow rate of a 3 month old infant is 6 liters per minute and for a 9 month old infant 9 liters per minute (Bougas, T., and Cook, C. D.: New Engl. J. Med. *262:* 511, 1960). At these flow rates the resistance offered by the component parts of an adult anesthesia machine are negligible (Orkin, L. R., Siegel, M., and Rovenstine, E. A.: Anesth. Analg. *36:* 19, 1957; Hunt, K. H.: ANESTHESIOLOGY *16:* 190, 1955). When wet, the unidirectional valve assembly used in this study offered a resistance of 2.5, 4.0 and 7.5 mm. of water at flow rates of 5, 10 and 20 liters per minute. The importance of the potential increase in dead space with this valve unit is diminished by the use of an endotracheal tube and by running a 5 liter gas flow. However, the valves remain closed during the expiratory pause and, undoubtedly, some minimal rebreathing does occur from this external dead space. The infants probably compensate for this by an increase in their ventilation. By placing the unidirectional valves in close proximity to the endotracheal adaptor and by running relatively high gas flows, the adult circle absorption system compares favorably with the insufflation technique of Ayre. With the presence of a rebreathing bag, respirations can be effectively assisted, making the use of this adult apparatus safe and physiologic for all age groups.

Effect of Carbon Dioxide on Intraocular Pressure in Anesthetized Man. YONG H. HAN, M.D., HARRY J. LOWE, M.D., and JOHN L. EVERS, Ph.D., *Department of Anesthesiology, Roswell Park Memorial Institute, New York State Department of Health, Buffalo, New York.* It has long been known that hypercarbia causes dilatation of cerebral blood vessels, increase in cerebral blood flow (CBF) (Kety, S. S., and Schmidt, C. F.: J. Clin. Invest. *27:* 484, 1948; Lewis, B. M., and others: J. Clin. Invest. *39:* 707, 1960), and rise in cerebrospinal fluid pressure (CSFP) (Wilson, W. P., and others: Anesth. Analg. *32:* 268, 1953). On the other hand, hyperventilation reduced the increased CBF and CSFP (Lundberg, N., and others: Acta Psychiat. Scand. *34* (Suppl. 139): 1, 1959). A recent report indicates that, in dogs, hypercarbia produced