

expert obstetrician, working closely together as a team. (Supported in part by a China Medical Board Visiting Professorship at Sapporo Medical College.)

**Quantitative Programmed Closed-circuit Methoxyflurane Anesthesia.** H. T. KYE, M.D., and H. J. LOWE, M.D., *University of Chicago, Pritzker School of Medicine, Chicago, Ill.* The rates of uptake of methoxyflurane at constant inspired and alveolar concentrations have been reported by Eger (*ANESTHESIOLOGY* 25: 94, 1964). In the present investigation, the rates of whole-body methoxyflurane uptake at constant arterial concentration (12 mg/100 ml or 2 ml vapor/100 ml blood) were calculated in twelve unselected patients from the individual organ volumes, blood flows, and anesthetic solubilities. *Methods:* Following induction with thiopental and intubation, liquid methoxyflurane was injected into the closed system by means of a Harvard infusion pump. The uptake curve for a 100-kg patient was plotted on a potentiometer curve follower (Data-Trak) and connected to the infusion pump by means of a rheostat which permitted reduction of the infusion rate in proportion to reduction in the weight of the patient. *Results:* At the programmed rates, the blood methoxyflurane concentrations gradually fell from maximum values (12–15 mg/100 ml) observed 15–20 minutes after induction to 9–12 mg/100 ml during the remaining 90–120 minutes of anesthesia. Since fat is the only tissue compartment with a sufficiently long time constant to contribute significantly to uptake after two hours of anesthesia, it was concluded that the blood flow to fat was 200 to 300 ml greater than that used in the model compartment system. *Summary:* In all cases, the program was satisfactory for surgical anesthesia. Blood methoxyflurane concentrations in the recovery room were all less than 3.5 mg/100 ml.

**Effects of Volatile Anesthetics on Non-excitable Tissue.** T. N. MACKEILL, M.D., and M. SCHWARTZ, Ph.D., *Departments of Anesthesiology and Engineering Physics, University of Louisville, Louisville, Ky.* To deter-

mine the fundamental effects of volatile anesthetics on nonexcitable living tissue, the gastric mucosa of the frog, *Rana pipiens*, was studied. *Methods:* An *in vitro* technique in which the frog gastric mucosa was mounted between cylindrical chambers was used. The secretory and nutrient solutions were aerated with a gas mixture containing a concentration of anesthetic, 5 per cent CO<sub>2</sub> and the remainder O<sub>2</sub>. The effects of methoxyflurane, halothane, fluorene, chloroform, and trichloroethylene upon the H<sup>+</sup> secretory rate were determined. *Results:* All agents of sufficient potency showed a marked increase in resistance as the H<sup>+</sup> rate decreased to zero. A striking effect was the correlation of the H<sup>+</sup> rate decrease with the relative potencies of the anesthetics. The mean concentrations of the first three agents necessary to produce a 40 per cent decrease in H<sup>+</sup> rate (methoxyflurane 0.54 per cent, halothane 2.4 per cent, fluorene 3.4 per cent) were each approximately three times the mean alveolar concentration (MAC) (*ANESTHESIOLOGY* 28: 994, 1967). From this study we predict the MAC for chloroform to be about 0.6 per cent. Preliminary estimates suggest that the MAC for trichloroethylene is about the same as that for chloroform.

**Pulmonary Venous Admixture before, during and after Halothane-Oxygen Anesthesia with Spontaneous Respiration.** B. E. MARSHALL, M.D., P. J. COHEN, M.D., S. AUKBERG, M.D., and C. H. KLINGENMAIER, M.D., *Department of Anesthesia, University of Pennsylvania, Philadelphia, Penna.* *Methods:* Pulmonary venous admixture ( $Q_v/Q_t$ ) was measured in ten patients premedicated with morphine and atropine before, during and after halothane-oxygen anesthesia with spontaneous respiration. *Results:* The preanesthetic  $Q_v/Q_t$  (mean  $4.4 \pm 0.6$  per cent) was positively correlated with age. After 40 minutes of anesthesia the  $Q_v/Q_t$  had increased threefold (mean  $12.1 \pm 2.1$  per cent) but only a minor further increase (mean  $14.8 \pm 2.8$  per cent) occurred after three hours. When anesthesia was discontinued,  $Q_v/Q_t$  returned to normal (mean  $5.2 \pm 0.9$  per cent) after three hours and to intermediate values at 40 minutes (6.5