promises the performance of the isolated heart more severely in the presence of elevated arterial pressure. The heart is still able to increase its volume output albeit at increased filling pressures. If the observed phenomenon applies also to the heart *in situ*, the fall in arterial pressure clinically observed during halothane anesthesia may be beneficial in that it may enable the heart to maintain an adequate output.

Rapid Blood Ether Determinations Using Gas Chromatography. JOHN M. BAKER, M.D., and BENTON D. KING, M.D., *Department of Anesthesiology, School of Medicine, State University of New York at Buffalo.* Renewed interest in the uptake and distribution of anesthetics by the body has pointed up the need for analytical methods capable of rapidly and accurately estimating the anesthetic concentration of multiple serial blood samples. Previously described procedures for the measurement of diethyl ether in blood have suffered from inaccuracy or prolonged and complicated manipulations. For this reason, a method for the measurement of blood ether was developed using gas chromatography that is simple, rapid, and accurate.

To minimize inaccuracy, solvent extraction was chosen in preference to manometric extraction or direct injection of the blood into the chromatograph. Because of its availability and solubility characteristics, carbon tetrachloride was used in a one-to-one ratio with blood, which was drawn and handled anaerobically until extraction with the solvent. For this purpose, 1 ml. of carbon tetrachloride was placed in a 3 or 5 ml., stoppered vial or Vacutainer. An equal amount of blood was withdrawn from the patient into a 2-ml. syringe provided with a Chaney adapter. The blood was transferred directly into the vial by attaching a needle to the syringe and puncturing the stopper. The vial was shaken gently for several minutes and then centrifuged stopper end downwards at high speed. The solvent layer next to the stopper was removed anaerobically using a microliter syringe and needle assembly. A 10 microliter sample was injected into the chromatograph for analysis. A Beckman model GC-2 gas chromatograph with a Carbowax 400 column material was used to achieve separation of the ether from the carbon tetrachloride. This instrument employs a thermal conductivity detector whose output is fed to a potentiometric strip chart recorder. The areas under the signal peaks as written by the recorder in response to ether flowing through the detector are a linear function of the amount of ether by weight in each sample; and when compared with the areas obtained with injection of known amounts of ether, the concentration of ether in the sample can be estimated within 1 per cent. When blood was extracted with carbon tetrachloride, a 95 per cent extraction of the ether was usual, with a standard deviation of 1.5 per cent. Thus, the overall accuracy was 3.9 per cent at the 99 per cent confidence limit. Because the extraction ratio tended to increase slowly with time, to 96 or 97 per cent if the samples were left in contact with the solvent overnight, separate reference standards were made for each sample and extracted in the same manner as the unknown samples. Overall accuracy was enhanced in this manner, since extraction time for both samples and standards was the same.

Increased Physiologic Shunting During Anesthesia and Surgery. H. H. BENDIXEN, M.D., J. HEDLEY-WHYTE, M.D., and M. B. LAVER, M.D., *Anesthesia Laboratory, Harvard Medical School, Massachusetts General Hospital, Boston, Massachusetts.* This study proposed to determine whether falls in arterial oxygen tension occur during clinical anesthesia, simultaneously with falls in pulmonary compliance; and to determine also if such falls in oxygen tension are reversible by sustained hyperinflation of the lungs. In the absence of periodic deep breaths, pulmonary compliance is known to decrease progressively (Mead, J.: Physiol. Rev. *41:* 281, 1961), caused, at least in part, by collapse of air spaces (atelectasis). The fall in compliance is reversible by sustained hyperinflation. If the perfusion of collapsed air spaces should continue, venous admixture to arterial blood, or increased physiologic shunting, would lead to a fall in arterial oxygen tension. If such a fall in oxygen tension is caused by collapse of air spaces, it should be reversible by sustained hyperinflation of the lung. *Method:* Fourteen surgical