few have reported limited studies on the acute effects of high oxygen concentration inhalation (*Barratt-Boyes, B. G., and Wood, E. H.: J. Lab. & Clin. Med. 51: 72, 1958*). Our method of study was to place catheters in both sides of the heart and to vary the inspired oxygen concentration. Determinations of cardiac output, central blood volume, pulmonary arteriolar resistance and alterations of mean pressure in the pulmonary artery, left atrium and aorta were then made. Dogs anesthetized with pentobarbital had their tracheas intubated, and then catheters were inserted in the following sites: pulmonary artery and right ventricle via the external jugular vein, left atrium via the carotid artery, femoral artery and aorta. The catheters were inserted under fluoroscopy and their location confirmed by pressure measurements. Radioactive indicators (RISA or Diodrast) were injected into the right ventricle and timed aortic samples obtained. Cardiac output and central blood volume were calculated by the method of Stewart and Hamilton. Each dog served as his own control. The first group of 7 dogs was allowed to breathe spontaneously and comparative observations made after ten minutes of both air and 96 per cent oxygen inhalation were inconclusive and inconsistent. The indicator injection was not made during any particular phase of respiration and the order of gas administration was reversed in 3 animals. The second group of animals was paralyzed with succinylcholine and their lungs artificially ventilated. After inhalation of various oxygen mixtures for at least 30 minutes the ventilator was disconnected just prior to the indicator injection. The dilution curve determination was made within 30–40 seconds and in the end-expiratory phase of respiration. Four dogs in this group had an additional study with 50 per cent oxygen. The order of study was arbitrarily varied. Arterial blood samples for *p*H, oxygen, carbon dioxide and hematocrit determinations were drawn just prior to each dilution curve and all blood lost in sampling was later replaced. During the study, arterial *p*H values did not vary more than 0.09 *p*H units from the control measurements except in one instance (0.11 *p*H units) and carbon dioxide content did not vary more than 1.2 m*M*/l. from the control except in another study (3.16 m*M*/l.). The control values were all normal (*Galla, S. J., et al.: Anesthesiology 20: 124, 1959*). Comparison of average control central blood volumes (per cent of body weight) revealed a significant ($p < 0.05$) difference: spontaneous respiration—1.16 per cent and artificial ventilation—2.12 per cent. The changes from air to 96 per cent oxygen inhalation were as follows: *cardiac output*—no consistent effect and a wide range of values, agreeing with observations of others (*Howell, C. D., et al.: Am. J. Physiol. 196: 193, 1959*); *mean pulmonary artery pressure*—decreased an average of 2.61 mm. Hg which was statistically significant ($p < 0.05$), agreeing with other studies (*Weil, P., et al.: Am. J. Physiol. 191: 453, 1957*); *central blood volume and pulmonary arteriolar resistance*—no consistent effect and a wide range of values with which there are no comparable studies. Changes in mean left atrial pressure and mean aortic pressure were very small and statistically not significant. Changes associated with 50 per cent oxygen ventilation were even less consistent. Although this study did not reveal any new effects of oxygen administration on the pulmonary circulation, we believe the method of study valuable for investigation of pulmonary vascular physiology.

Gas Chromatography as an Analytical Tool in Anesthesiology. L. W. Fabian, M.D., and Marion A. Carnes, M.D. *Department of Anesthesiology, University of Mississippi Medical Center, Jackson, Mississippi.* Gas chromatography has been explored only recently for possible medical applications. This method provides rapid and accurate quantitative analysis of individual components in gas or gas-vapor mixtures and would seem particularly applicable in the field of anesthesiology. Accordingly, an investigation of the merits and over-all practicality of gas chromatography in laboratory and clinical anesthesia was undertaken. The equipment used in these studies included a Beckman GC-2 Chromatograph, a Minneapolis-Honeywell Brown Recorder, a Brown Integrator and a Sola constant voltage transformer. The use of this combination of equipment provided automatic and reproducible analyses of all components in gas mixtures within a period of 5 to 8 minutes.

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The gas chromatograph consists basically of a heated sample inlet system, a temperature-controlled column containing material which elutes various components from a mixture, a thermal conductivity cell and a reference gas system. Helium is used as the reference gas and as the vehicle or carrier gas for the samples. The sample is introduced into the stream of carrier gas and swept into the chromatographic column, where it is adsorbed (or absorbed) by the column filling material. As the carrier gas continually flows through the column it carries off individual components at different times. The time required for each component to pass through the column depends upon the equilibria between sample components, carrier gas, and column filling material. The gases flow from the column through the sensing side of the detector cell to the exhaust at the rear of the instrument. A corresponding flow of carrier gas flows through the reference side of the cell, first passing through the heated compartment so that it reached the cell at the same temperature as the sample-carrier gas mixture. Both carrier gas streams are exhausted at atmospheric pressure. The difference in thermal conductivity between the carrier gas in the reference side of the detector cell and the sample-carrier gas mixture in the sensing side produces a voltage differential which is indicated by the recorder. When only carrier gas is flowing through the system there is no voltage differential, hence no signal to be indicated by the recorder. The recorder to which the differential voltage is transmitted plots a curve showing the separation of the sample into its components. The area beneath the trace is proportional to the quantity of the sample component. The peak height, in many instances, may be used as a quantitative measure of each component particularly when the components are present in equal quantity in the mixture of gases.

The instrument was calibrated using samples containing known percentages of anesthetic gases determined by an anesthetic machine whose flowmeters had been checked for accuracy by calibrating flowmeters or water displacement. Analysis of vapors required preparation of standards under known conditions of temperature, volume and pressure. Calibration curves were plotted from data obtained from the peak areas and heights of the standards. During anesthesia, samples of expired air were analyzed accurately for concentrations of each component in any anesthetic mixture, oxygen and carbon dioxide. For these analyses, samples were drawn from beneath the face mask or when applicable from the endotracheal tube using a 50 cc. syringe and three-way stopcock attached to a polyethylene catheter. Contamination of the sample by room air was prevented by sealing around the catheter and by flushing the syringe several times with the sample to be analyzed. This technique has been used successfully for multiple analyses of cyclopropane, ether, fluothane, ethylene, nitrous oxide, oxygen and carbon dioxide. Blood gas analyses can also be performed by gas chromatography by extracting the gases from blood in the Van Slyke manometric apparatus and manipulating these gases through the waste arm of the blood gas apparatus and into the sampling inlet of the chromatograph. Experience gained in these gas chromatographic studies indicate a wide application of this technique can be made in anesthesiology for both clinical and laboratory purposes.

The Postoperative Renal Excretion of Water in Infants. DANIEL S. FLEISHER, M.D., WALLACE W. MCCRORY, M.D., AND LEONARD BACHMAN, M.D. *Children's Hospital of Philadelphia, Departments of Pediatrics and Anesthesiology, University of Pennsylvania Schools of Medicine, Philadelphia Pennsylvania.* Patterns of renal excretion of water during operation and postoperative periods have not been clearly defined. Present evidence would seem to indicate a limitation in water excretion in adults during the first postoperative day but similar evidence is lacking for infants hydrated before and during operation. No studies have included the immediate postoperative period; hence this period is the basis of this study. Water loads (3 per cent of body weight) were administered to a group of male infants immediately following surface surgical procedures. The subjects ranged in age from 3 to 27 months. The patient's response to an identical water load administered at a time unrelated to operation served as his control observation. No efforts were made to hydrate 5 infants prior to or during surgery. All of these subjects demonstrated a delayed response to the postoperative water loads. This was characterized by a drop in serum sodium and/or osmolality and no (or little) excretion of "osmotically free water." Seven infants were hydrated prior to and during operation. Two of these subjects revealed patterns of response similar to the nonhydrated

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