during, and after delivery by the Sanborn fetal electrocardioscope, using abdominal and scalp electrodes. Fetal heart rate invariably dropped to 70 or fewer beats per minute during the final contractions and when forceps were applied. No agent prevented or enhanced this bradycardia. Fetal heart rate rapidly returned to a normal rate when respiration began. Fetal bradycardia occurred on two occasions during hypotensive episodes with spinal anesthesia. One instance of complete fetal heart block was recorded during cyclopropane anesthesia. The rhythm was immediately restored to normal on delivery of the head. Preliminary studies support the observation (Vasicka, A., and Kretchmer, H.: Amer. J. Obstet. Gynec. *82:* 600, 1961) that uterine contractility based on intra-amniotic pressure measurements diminishes markedly with both halothane and ether, diminishes moderately with cyclopropane, and is not affected by saddle block (even above T-10). *Summary:* Light halothane-nitrous oxide anesthesia, when properly controlled, produces no excessive maternal blood loss, fetal depression, or fetal ECG changes and eliminates the explosive risk of cyclopropane and ether in the delivery room.

Evaluation of Preanesthetic Medication. FREDERICK A. CARPENTER, M.D., JOHN E. STEINHAUS, M.D., PH.D., SAM C. WEBB, PH.D., and RALEIGH THOMPSON, B.A., *Department of Anesthesiology, Grady Memorial Hospital, Atlanta, Georgia.* The diversity of opinion concerning the proper preanesthetic medication has been largely due to the lack of an objective method for the evaluation of these agents. Although we had had encouraging results with the use of rating scales, the advantages of quantification and reproducibility led us to investigate skin resistance and the psychogalvanic reflex (PGR) as an indicator of the change in apprehension following various preanesthetic agents. A preliminary investigation using volunteers (medical students) revealed changes in PGR following these drugs, although it was recognized that no preoperative apprehension was present. *Method:* The present study was conducted on patients who were tested just prior to surgery. The patient selection was limited as follows: (1) weight (100–200 lbs.), (2) age (15–60 years), (3) no seriously ill patient (P.S. I–III), (4) no CNS drug therapy. A double blind technique was employed using 4 drugs and the placebo administered in random order. The test agents were given intramuscularly on a weight basis so that each patient received 0.02 ml./pound (3.0 ml./150 pounds) of the unknown solution. The following amounts of drugs were used: pentobarbital 30 mg./cc. (90 mg./150 pounds), meperidene 25 mg./cc. (75 mg./150 pounds), promethazine 12.5 mg./cc. (37.5 mg./150 pounds), hyroxyzine 50 mg./cc. (150 mg./150 pounds). A fairly stable base line, requiring approximately fifteen minutes, was obtained prior to the control period. A control period of fifteen minutes for each patient determined changes in skin resistances caused by the PGR (stimulated by standarized flashes of light) before any drug was given. The administration of the unknown agent was followed by a test period of one hour, which was divided into four periods of fifteen minutes each. The light flash occurred 3 times at random intervals during each period, and the resulting skin resistance changes were read directly in ohms from the ink recording apparatus located outside of the test room. The entire test procedure was remotely controlled. The absolute resistance was translated into log conductance values for purposes of analysis and the Alexander Trend test was used in the analysis of this data. There were 10 patients tested for each drug and placebo. *Results:* The results were highly significant ($P < 1$ per cent) when hydroxyzine, promethazine and pentobarbital were compared to the placebo. Although the group slope of meperidine appeared to show a great difference from the placebo, a scattergraph of meperidine action indicated wide variability of individual response. On the other hand, the group slope of promethazine shows the least difference from the placebo, but the scattergraph shows a consistent action. It is estimated that 20 additional subjects would be needed to indicate a significant difference of meperidine from its control level, according to an analysis by the Alexander Trend test which considers the experiment over a period of time and not at a given time as does the *t* test. When a pool variance *t* test was applied to the 45 minute PGR scores, the differences between the scores of each drug and placebo were highly significant ($P < 1$ per cent). An additional study was instituted to determine the correlation of rating scales and the psychogalvanic reflex as a method of evaluating preanesthetic drugs. The same four drugs (hydroxyzine, promethazine, pentobarbital, meperidine) and a placebo were used at three dose levels. Each patient was simultaneously evaluated by PGR changes and rating scales by two independent observers on a double blind basis. The PGR was measured as previously described and six rating scales (eyelid movement, eyelid position, facial tension, bodily movement, breathing regularity, and awakeness) were rated on a 7 point scale as in previous studies. Statistical analysis showed that the PGR and the rating scales, bodily movement and eyelid movement, changed in a similar direction and degree. The correlation was highly significant to the 0.5 per cent level of confidence. Both methods of evaluation showed a highly significant difference between all drug dosages and the placebo. Drug dose curves could not be drawn from this data due to the small groups of patients (five). *Comment:* Additional studies will be made to determine if a dose effect can be demonstrated. There appears to be no way at present to rule out the possibility that the PGR merely shows change in peripheral autonomic reactions due to the drugs tested. Statistically this study shows a good correlation between changes produced by preanesthetic drugs as measured by a machine (PGR) and as measured by an observer.

Effect of Respiratory Obstruction on Brain Size and Motion. HAROLD F. CHASE, M.D., M. A. KILMORE, M.S., and R. M. TOMASELLO, R.N., *Jefferson Medical College, Department of Anesthesiology, Philadelphia, Pennsylvania.* By observing the cerebrospinal fluid pressure and by direct observation of the brain, it has been noted that pulsation of the brain occurs, which corresponds to the rhythm of respiration. A more careful observation showed that the brain moved outward during expiration or increased intrathoracic pressure. In previous work it has been reported that this pulsation was greatly exaggerated during respiratory obstruction and if unrelieved, eventually led to a herniated brain. *Method:* Central arterial, central venous endotracheal, esophageal pressures as well as the electrocardiogram were recorded on a direct writing Grass polygraph. Movement of the brain was recorded graphically on a smoked kymograph and also electronically, using a variable capacitor and the polygraph as the readout instrument. The electronic instrument was developed in our laboratory. In the first group of dogs, inspiratory, expiratory, and endotracheal (combined inspiratory and expiratory) obstruction were produced for 10 minutes each, allowing sufficient time for the animal to recover between episodes. *Results:* The immediate effect of inspiratory obstruction was: (1) exaggerated respiratory pulsations of the brain and (2) a decrease in the size of the brain, which eventually returned to the control size or became herniated if the animal could not compensate for the obstruction. With expiratory obstruction, there was an immediate increase in the size of the brain, in contrast to inspiratory obstruction. After expiratory obstruction was removed, the brain returned to its preobstruction size almost immediately, whereas after removal of inspiratory obstruction, in animals which could not fully compensate, it took much longer time for the brain to return to its preobstruction size. Endotracheal or to-and-fro obstruction caused the widest respiratory pulsations of the brain, and also caused the brain to herniate. After endotracheal obstruction was removed, as during inspiratory obstruction, there was a considerable lag of time before the brain returned to its control size. In all cases, the pattern of the pulsating brain was similar to the pattern of the venous pressure. To see how the intrapulmonary pressure changes produced during obstruction, without hypercapnia or hypoxemia, might affect the size of the brain, experiments were performed using the Bird ventilator. Even a rate of 10/minute with positive endotracheal pressure of 10 mm. Hg produced a significant change in respiratory pulsation pattern of the brain as compared with that of normal breathing. When the