on the seventh postoperative day, on a group of healthy women undergoing gynecologic surgery. The patients were grouped in three series according to the major anesthetic agent employed, trichlorethylene, cyclopropane, or ether. *Results:* The findings indicate that these hepatic functions were not affected more following anesthesia produced by trichlorethylene than following anesthesia produced by either cyclopropane or ether. The level of serum cholinesterase activity was decreased following all three types of anesthesia: arithmetic mean values of 16 patients receiving trichlorethylene were 244.7 units preoperatively, 190.0 units on the second postoperative day (3 abnormal values), and 185.9 units on the seventh postoperative day (7 abnormal values); the arithmetic mean values of 20 patients receiving cyclopropane were 197.7 units preoperatively, 170.7 units on the second postoperative day (5 abnormal values), and 168.9 units on the seventh postoperative day (7 abnormal values); and the arithmetic mean values of 20 patients following ether anesthesia were 216.6 units preoperatively, 182.6 units on the second postoperative day (4 abnormal values), and 169.4 units on the seventh postoperative day (8 abnormal values). Cholesterol esterification was abnormal following trichlorethylene anesthesia in 2 patients on the second postoperative day and 2 patients on the seventh postoperative day; following cyclopropane anesthesia in one patient on the second postoperative day and 5 patients on the seventh postoperative day; and following ether anesthesia in 2 patients on the second postoperative day and 3 patients on the seventh postoperative day. The level of alkaline phosphatase was abnormal following trichlorethylene anesthesia in 2 patients on the second postoperative day and one patient on the seventh postoperative day; abnormal following cyclopropane anesthesia in only one patient on the seventh postoperative day; and abnormal following ether anesthesia in 2 patients on the second postoperative day and 4 patients on the seventh postoperative day. Total bilirubin was abnormal following trichlorethylene anesthesia in one patient on the second postoperative day; abnormal following cyclopropane in 2 patients on the second postoperative day and one patient on the seventh postoperative day; and abnormal following ether anesthesia in 2 patients on the second postoperative day. The cephalin-cholesterol flocculation determinations were normal in all instances following anesthesia produced by trichlorethylene; showed a 2+ or 3+ determination after 48 hours on the second postoperative day in 3 patients following cyclopropane anesthesia; and showed a 2+ determination after 48 hours in 4 patients on the second postoperative day following ether anesthesia, and a 3+ determination in 48 hours in one patient on the seventh postoperative day. *Discussion:* The results are of interest since the virtual epidemic of recent reports of postoperative liver dysfunction following the administration of halogenated hydrocarbon anesthetics, halothane and methoxyflurane, has suggested once again the inherent hepatotoxicity of the halides. Neither the present limited study or a very similar study following halothane anesthesia performed several years ago reveals any more effect upon the normal liver than that following cyclopropane or ether anesthesia, yet massive hepatic necrosis is reported to have occurred following both halothane and trichlorethylene, as well as after cyclopropane and ether. It may be that this type of pharmacological testing is inadequate to reveal hepatotoxicity because of the insensitivity of the liver function tests employed, or because of the size of the sample tested; or it may be that massive hepatic necrosis following anesthesia occurs as a result of other factors than the anesthetic drugs themselves.

Influence of Inhalation Anesthetics on Potassium Content of Rat Atria. R. R. PARADISE, PH.D., and L. K. GRIFFITH, B.S., *Departments of Anesthesiology and Pharmacology, Indiana University, Indianapolis, Indiana.* Research involving the effects of inhalation anesthetics on isolated contractile tissues has generally been hampered by the lack of a suitable method of metering quantities of anesthetics into the bathing medium which will affect the tissue in a constant and reproducible manner. *Apparatus:* An electronic device which will accomplish this function has been developed recently in our laboratory. With our device, the Anesthetistat, any reasonable control lever can be obtained

by the adjustment of a potentiometer. In our system, the tissue, which is tied to an electrode holder, is suspended by a thread from a strain gauge in an open, well oxygenated, constant temperature bath. It is stimulated at a constant rate and the force of contraction is measured by the strain gauge. The signal from the strain gauge is recorded on an Offner Dynograph. An amplified signal from the strain gauge is obtained from the Dynograph and is used as the input signal for the Anesthetistat. The Anesthetistat is connected to a solenoid valve which can select either a 95 per cent oxygen-5 per cent carbon dioxide mixture or an oxygen-carbon dioxide-anesthetic vapor mixture. This gas mixture is then fed into the tissue bath through a fritted glass bubbler. When the force of contraction is higher than the preset value, the valve allows the anesthetic vapor mixture to pass into the bath. Correspondingly, when the force of contraction is lower than the preset value, which is caused by too much anesthetic, the valve allows only the passage of the oxygen mixture into the bath and the excess anesthetic agent evaporates from the bath. Thus, by this simple servo mechanism, we can preset and continuously control the effect of the anesthetic on the tissue. *Method:* Isolated rat auricles were suspended in modified Krebs-Henseleit solution and stimulated 200/minute at 29° C. The muscles were contracting against an 0.7-g. load. After a one-hour equilibration period anesthetic was introduced into the bathing solution for a two-hour period to produce and maintain a 50 per cent decrease in the force of contraction after which the muscles were removed, blotted (Paradise, R. R.: Nature *198:* 112, 1963), and analyzed for potassium with a flame photometer. The results were compared with muscles stimulated for three hours in the absence of anesthetic. *Results:* The results in mEq. K^+/kg. wet tissue ± standard deviation follow: control—79.7 ± 5.1 (18), halothane—79.0 ± 5.2 (10), chloroform—75.3 ± 6.8 (12), and methoxyflurane—81.7 ± 1.6 (9). According to the *t* test, none of the results was different from the control values at the 5 per cent level of significance. Figures in parentheses represent the number of experiments done in each group. Thus, quantities of halothane, chloroform and methoxyflurane which depressed the force of contraction of isolated auricles 50 per cent for two hours were without apparent effect on the tissue potassium content. (Supported in part by Grants HE-07718-01 and H-6308, National Heart Institute, U.S.P.H.S.)

A Method of Induction of Anesthesia in Children. N. J. PAYMASTER, M.B., D.A., H. WOLLMAN, M.D., and L. BACHMAN, M.D., *The Children's Hospital of Philadelphia, Philadelphia, Pennsylvania.* A low flow, rebreathing technique of induction of anesthesia in children was studied by observing its effect on CO_2 levels and the incidence of cardiac arrhythmias. *Method:* Induction was begun with cyclopropane and oxygen in a to-fro system using a total flow of 1,200 ml./minute into a two liter bag. As soon as possible 300 ml./minute of oxygen passing through ether in a copper kettle were added, and ventilation was controlled. In half of the patients studied a canister was interposed between the face mask and bag. Following tracheal intubation, nitrous-oxide, oxygen and ether were administered in a nonrebreathing system. Heart rate and blood pressure were measured every minute. The electrocardiogram was recorded continuously. The end-expired CO_2 concentration was monitored with an infra-red analyzer. In ten patients end-expired cyclopropane, ether, oxygen and nitrogen were also measured with a gas chromatograph. *Results:* Seventy-six patients were studied—40 without and 36 with CO_2 absorption. The groups were comparable with respect to mean age, weight, and physical status. Similar gas concentrations were recorded in the two groups. End-tidal cyclopropane concentration varied between 20 and 30 per cent before intubation and the ether concentration never exceeded 3.2 per cent. In the group without CO_2 absorption the mean end-expired CO_2 concentration increased from 5.9 per cent at one minute to 6.4 per cent after five minutes prior to intubation. In the group with absorption, the end-expired CO_2 decreased from 4.9 per cent to 3.5 per cent over the same interval. When CO_2 absorption was not employed, end-expired CO_2 concentration was significantly higher in the larger children. Systolic and