absorption was illustrated by the procaine concentration of 1.09 μg./ml. achieved 30 seconds following injection of 1 ml. of 2 per cent solution. The absorption curves resulting from 1 ml. each of a 1 per cent and 2 per cent procaine solution, did not demonstrate a linear relationship during the initial five minute absorption period. The concentrations resulting from the 2 per cent solution far exceeded the linear increase expected due to the larger dose administered. This increase was due possibly to the vasodilating property of procaine. The addition of 1:100,000 epinephrine to a 2 per cent solution effectively retarded absorption, but the minimal initial effect may have been due to the vasodilating potential of low concentrations of epinephrine.

Central Nervous Actions of Halothane Which Affect the Circulation. H. L. PRICE, M.D., H. T. MORSE, M.D., and H. W. LINDE, PH.D., *Department of Anesthesia, University of Pennsylvania Schools of Medicine, Philadelphia, Pennsylvania.* The cause of arterial hypotension during halothane administration has been attributed by various authors to ganglionic blockade, direct actions on vascular smooth muscle, myocardial depression, and actions exerted within the central nervous system. None of the suggested mechanisms has actually been shown to operate; consequently it is not known which, if any, of the suggestions is correct. *Method:* In the experiments to be described, halothane was administered to the cephalic circulation of dogs while effects on the systemic circulation were recorded. Circulation to the head was supplied by a pump-oxygenator. Heparin was used to prevent coagulation. The blood was perfused through the brachiocephalic artery and collected from the superior vena cava downstream from the point of entry of the azygos vein. To provide anesthesia for the necessary surgical operations chloralose was given intravenously in small (50–70 mg./kg.) dose. Halothane in oxygen was supplied to the oxygenator when desired by means of a vaporizer. A Beckman infrared analyzer sampling expired air by the microcatheter technique was used to detect contamination of the systemic circulation with halothane. The limit of sensitivity of this instrument was 0.05 per cent halothane. In no experiment was contamination detected. *Results:* Preliminary findings were that halothane could produce all of its characteristic actions on the systemic circulation when its distribution was confined to the head. Measured changes included diminished carotid sinus reflex, arterial hypotension, reduced myocardial contractile force, and bradycardia. Most or all of the changes appeared to result from reduced sympathetic nervous discharge.

Reflex Activity of the Larynx During Breathing. C. C. RATTENBORG, M.D., M. D. BARTON, M. L. KAIN, W. J. LOGAN, H. R. KONRAD, and D. A. HOLADAY, M.D., *Section of Anesthesiology, University of Chicago School of Medicine, Chicago, Illinois.* The larynx participates actively in breathing. The normal laryngeal reflexes open the larynx during inspiration. This pattern was observed in a large number of dogs anesthetized with either pentobarbital or halothane. *Method:* The present study included five dogs. The respiratory airflow was monitored by a pneumotachograph connected to a tracheotomy tube. The laryngeal resistance to airflow was recorded continuously as the translaryngeal pressure gradient caused by a constant flow of air being passed through the larynx. Electromyograms (EMG) were obtained with platinum wire electrodes. Inspiratory activity during quiet breathing was obtained most consistently from the middle constrictor, which was demonstrated to be a laryngeal "opener" by electrical stimulation. Electromyograms of the ala nasi and the diaphragm were also obtained. The time pattern of the events was related to the moment the airflow started. *Results:* Activity of the ala nasi preceeded the airflow by 50–150 milliseconds. The diaphragm started 0–50 milliseconds before the airflow. In the normal dog EMG activity in the middle constrictor started 0–150 milliseconds after the flow, but before an appreciable flow was achieved. The time pattern was observed to be unaltered from very light anesthesia (halothane 0.25 per cent) to deep anesthesia (3 per cent). The pattern on EMG intensity was related to depth of anesthesia. The activity in the diaphragm decreased with increasing depth of anesthesia as did the respiratory airflow. The ala nasi muscle showed a practically unchanged ac-