Chloroform	
.26 cc. per minute	1%
.52 cc. per minute	2%
.78 cc. per minute	3%
Methoxyflurane	
.19 cc. per minute	½%
..38 cc. per minute	1%
.76 cc. per minute	2%
142 cc. per minute	3%

References: Morris, L. E.: New vaporizer for liquid anesthetic agents, ANESTHESIOLOGY 13: 587, 1952; Morris, L. E., and Feldman, S. A.: Considerations in design and function of anesthetic vaporizers, ANESTHESIOLOGY 19: 642, 1958; Fabian, L. W. *et al.:* Method for determining vapor concentrations of volatile anesthetic drugs, ANESTHESIOLOGY 19: 51, 1958; Handbook of Chemistry. Handbook Publishers, Inc., 1952.

A Simple Apparatus for Administration of Halothane

Captain Norman R. Hillmer, Lt. Konstantine Kalandros, and Major Paul R. Hummell of Valley Forge General Hospital note that a method of efficient vaporization and introduction of halothane into a closed anesthetic circuit has posed some problems. They describe an inexpensive adaptation of a standard Heidbrink ether vaporizer for this purpose.

A polyvinyl plastic catheter (diameter 0.039 inch) is fitted over a blunted 23 gauge needle attached to a one-way stopcock and a 5-cc. syringe. The plastic catheter is passed through a small rubber or cork stopper which will fit the filling port of a Heidbrink ether vaporizer in place of the screw plug. Passage of the catheter through the stopper is accomplished by first introducing an 18 gauge needle (thin-wall) through the stopper. The catheter is threaded through the needle, and the needle is withdrawn over the tubing. The stopper is placed in the filling port of the vaporizer and the catheter is adjusted to deliver the halothane directly onto the wick in order to aid vaporization.

The vaporizer may be on either the inhalation or the exhalation side of the circuit. Preferably it should be on the exhalation side to allow dilution of the agent in the rebreathing bag. Because of this dilution on the exhalation side, the vaporizer is ordinarily left wide open. If the vaporizer is on the inhalation side of the circuit it is better to use it partially closed to avoid sudden high concentrations of the agent. (A setting near three on the scale has been found to be adequate.) In any event, the variable opening provides a good safety factor. If too much halothane is injected the vaporizer may be closed. The agent can be gradually admitted by opening the vaporizer as needed.

A more permanent apparatus as illustrated has been made by one of us (K. K.) utilizing a 10 inch length of stainless steel tubing (inside diameter approximately 0.039 inch in order to fit snugly over the blunt 23 gauge needle), and a small piece of polyvinyl or polyethylene plastic (as from a squeeze bottle) approximately $\frac{1}{16}$ inch thick. As before, the 23 gauge needle, one-way stopcock and 5-cc. syringe are utilized.

The ball and spring safety valve are removed from the standard metal screw plug of the filling port. A disc of the plastic is cut to size (approximately $\frac{5}{32}$ inch diameter)to fit into the hiatus from which the ball was removed. A small hole is punched in the center of this plastic disc and the stainless steel tubing is then fitted into place in the plug. The spring and retainer are slipped over the tubing and

A simple apparatus for closed halothane anesthesia.

screwed in place. The entire assembly is placed in the filling port. The tubing is slipped over the 23 gauge needle with the stopcock and syringe attached. The end of the tubing in the vaporizer is adjusted to deliver the halothane directly onto the wick. The outer section of the tubing may be bent to allow mounting of the syringe wherever desired. Longer or shorter tubing may be used to aid convenient mounting.

This material has been reviewed by the Office of The Surgeon General, Department of the Army, and there is no objection to its presentation and/or publication. This review does not imply any indorsement of the opinions advanced or any recommendation of such products as may be named.

Cardiac Arrest Board

Dr. Gordon M. Greenblatt of Winter Park, Florida, notes that one of the essential features in closed chest cardiac resuscitation is that the patient be placed on a firm hard surface. Many cardiac catastrophies happen with the patient in a bed supported only by a soft inner spring or foam rubber mattress. This usually necessitates carrying the patient from the bed and placing him on the floor. The time spent in gathering enough help, disconnecting Levine tubes, Foley catheters, intravenous infusions, are restraints, and other incumbrances can be better spent in performing the actual resuscitation.

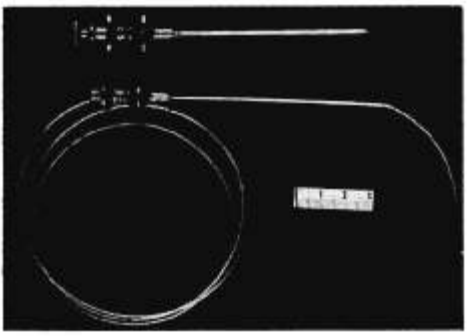
He has solved this problem with a 14 × 20 × ¾ inch plywood board that can be easily slipped under the patient's thorax. This provides a very satisfactory firm support for the resuscitation. One of the essential characteristics of the board is that it have a smooth surface so that resistance between patient, board, and bed is minimal when the board is inserted. This can be done with multiple coatings of shellac on a smoothly sanded surface.

The board is then labeled "Cardiac Arrest Board" and placed with the cardiac arrest cart or other resuscitation equipment.

This technique is a compromise to the ideal surface for resuscitation, but it is an easily available technique and saves valuable time.

Epidural Needle

Dr. Philip R. Bromage of the Royal Victoria Hospital in Montreal notes that most anesthetists who practice epidural analgesia are familiar with the advantages of the Huber tip on the Tuohy needle. Its prime function is to give a bias to catheters during insertion, so that they will glide smoothly up the spinal canal, and not impinge forcibly upon the dura at right angles. In addition to this, accidental puncture of the dura occurs much less frequently with Huber-tipped needles than with the more orthodox, short-bevelled point.



Thoracic epidural needles, 18 and 16 gauge.

Design of the other end of the needle should vary according to the needs of the technique employed to identify the epidural space. The ordinary standard hub to the Tuohy needle is quite satisfactory for performing the Sicard-Dogliotti (loss-of-resistance) test. But the hanging-drop method of Gutierrez requires a needle which can be held firmly and securely, without fingers and thumbs encroaching on the orifice and the suspended drop. And so, for thoracic and cervical punctures, where the hanging-drop technique is usually employed, Dr. Bromage recommends a needle which combines the advantages of both a Huber point and a good finger-grip. A needle of this type has been developed for Dr. Bromage, with a Huber tip on the end of a Crawford needle (see figure). It has proved extremely satisfactory.