



FIG. 4. Relative failure of the thermocompensating mechanism of an ether vaporizer during prolonged use.

actual concentration was always lower than the settings would indicate, regardless of the flow rate (fig. 3). The Halothane "Ten" was reasonably accurate when the dial was set at 1-7 per cent with flow rates of 2 liters per minute. Dial settings in excess of this resulted in low actual concentrations. The maximum obtainable concentration was 8.75 per cent when the dial was set at 10 per cent with a 2 liter flow rate. When flow rates were increased the actual concentration of halothane delivered decreased markedly. The concentration of ether was found to most closely approach the dial setting when the latter was set at 5 or 10 per cent and the flow of oxygen was 4 liters/minute. At lower flows the concentration was diminished, the same is true of flows in excess of 4 liters. The maximum obtainable concentration was 17 per cent when

the dial was set at 20 per cent and one liter of gas flowed through the vaporizer (fig. 3). The relative failure of the thermocompensating device in the ether vaporizer is shown in figure 4. In the the halothane vaporizers, at flow rates of 2-6 liters and at low dial settings, the change in concentration of anesthetic flowing from the apparatus varies little with time over a three-hour period. At high flow rates and high dial settings, failure of the compensating device becomes evident in 30-60 minutes. The vaporizers are not valved; thus, concentration rises considerably, but momentarily, when positive pressure is applied to the system and is then released.

The one marked advantage of this group of vaporizers is that they tend to err on the low side. Thus, the concentration never exceeds that indicated on the scale.

(We have recently had several of these vaporizers calibrated for methoxyflurane. The range is from 0.25 to 1.5 per cent. These have been found to be extremely accurate at all flow rates and concentrations and are well thermal compensated.)

#### REFERENCE

1. Zauder, H. L., and Orkin, L. R.: Applications of gas chromatography to anesthesiology. *Gases and vapours*, *Canad. Anaesth. Soc. J.* 10: 228, 1963.

## Capacity of Suction Tubing

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Brief measurements using standard (No. 204 1/4-inch, inside diameter) amber suction tubing with a 14 F. catheter indicate that considerable amounts of blood are contained in the tubing before any blood appears in the suction bottle for measurement as loss. The amount varies, increasing as the height of the bottle from the floor or the length of tubing increases. Tubing of this size will hold 8 ml. per foot of length when filled

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completely. Under usual operating-room conditions it does not lay filled but rather irregularly contains blood which bubbles within its walls. Under these conditions it will contain about 1.1 ml. per foot if the highest point enroute to the bottle is four feet from the floor. Increasing the bottle elevation to six feet increases content to over 1.5 ml. per foot. The significance of this in blood replacement in premature or newborn infants is obvious. (A constant suction of 18 liters/minute was used in these measurements.)