"Gassing" a Water Bath

To the Editor:—We would like to point out that in none of several recent publications concerning anesthetic actions on the heart *in vitro* is the effective anesthetic partial pressure actually measured. Some authors measure the concentration in the bath and report the results as mg/100 ml, which is meaningless unless a partition ratio is specified. Others apparently measure the anesthetic content of gas samples but do not indicate the sampling site; this is an important omission because uptake of anesthetic molecules in the apparatus used to deliver the agent can modify the gas composition distal to the source. A particular instance of this kind has recently come to our attention.

The standard muscle chamber is "gassed" by passing gases into the bottom of the bath through a sintered glass filter disk which poses considerable resistance to flow. Not only does this resistance produce a "back pressure" that affects vaporizer performance, but it apparently impedes the flow of individual gas molecules in proportion to the density of each gas. Thus, a mixture of oxygen, carbon dioxide, and halothane may accumulate halothane proximal to the disk; a reduced concentration will be found downstream, that is, in the bath itself. Using one muscle bath we found, using a Fluotec vaporizer, that the halothane concentration proximal to the sintered glass disk was 1.7 per cent, that distal to the disk was 1.2 per cent.

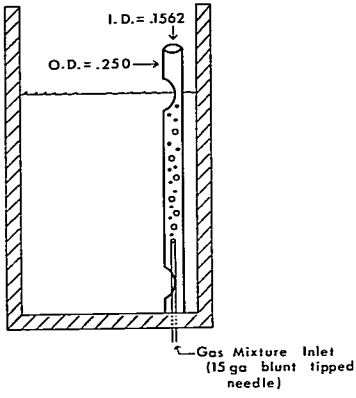

FIG. 1. Plexiglass chamber.

We now use a chamber which eliminates the need for a high resistance gassing device (fig. 1). This device can be simply and inexpensively constructed of plexiglass, and operates at atmospheric pressure, thus obviating the difficulties cited above.

A major purpose of this note is to report that we do not agree with the findings of Brown and Crout (ANESTHESIOLOGY 34:236–245, 1971) with respect to the actions of halothane. They report a 40 per cent depression of isometric contractile force at 0.8 per cent halothane (site of measurement not specified). We find an equal depression at half this concentration, or less, whether measured at the entry of gas into the chamber or at its exit above the bath. Thus, we question all of their findings on methodological grounds.

PRAMOD VONGVISES, M.D.
THOMAS A. WEBSTER, M.D.
HENRY L. PRICE, M.D.
Department of Anesthesiology
Temple University Health Sciences Center
3401 N. Broad Street
Philadelphia, Pennsylvania 19140

To the Editor:—We agree with Vongvises, Webster, and Price that vaporizers of the Fluotec type are inaccurate used within a high-pressure system such as a muscle bath with a sintered glass disc. A conventional rotameter flowmeter is also inaccurate in such a system. However, we do believe that maximal dispersion of the inflowing anesthetics and oxygen into a tissue bath is mandatory, as optimal oxygenation of these muscles in an electrolyte solution is critical. Since the surface area of a given volume of gas bubbling through a liquid is greater the smaller the size of the bubbles, fine dispersion is essential. Figure 1 illustrates the apparatus we used to volatilize inhalation anesthetics. Liquid anesthetic in the Hamilton gastight syringe was