

determine the uncertainty associated with this problem one has to determine the function $p(T)$. In other words the pressure and temperature gradients within the high pressure cell have to be established. Equation 4 reduces to,

$$V = A \int_{T_1}^{T_2} p(T) dT \quad (5)$$

which is a constant times the area under the curve $p(T)$ vs T . The error introduced by assuming no pressure gradients where there are temperature gradients is just the difference in area between the actual $p(T)$ vs T curve and the area calculated if it is assumed that $p = p_{\max.}$ from T_1 to T_2 and is zero everywhere else.

We have made a detailed analysis of the pressure and temperature distribution in our piston cylinder cell and have established the $p(T)$ relation so that the area is determined to an accuracy of 2 percent.

EXPERIMENTAL

Single wire measurements were carried out in both a hydrostatic gas apparatus to 8 Kb, and in a piston cylinder solid media apparatus to 40 kilobars. A schematic diagram of the hydrostatic apparatus is given in Figure 2. The materials measured were standard 36-gage teflon-coated thermocouple wire. The wires were threaded through the 0.6-mm-diameter bore of a stainless steel high-pressure tubing. One end was