This circuit is used for the so-called single-wire experiment, an accurate means of measuring the T.E.P. pressure dependence. In this circuit, a single wire is brought into a high pressure vessel through an isothermal pressure seal at a temperature T_1 and is brought out through a similar seal at a temperature T_2. The induced voltage using Equations (1) and (2) is the following

$$V(p_i) = \int_{T_0}^{T_1} \alpha_a(T)dT + \int_{T_1}^{T_2} \left[\alpha_a(T) + \Delta\alpha_a(p_i,T)\right]dT + \int_{T_2}^{T_0} \alpha_a(T)dT$$

$$= \int_{T_1}^{T_2} \Delta\alpha_a(p_i,T)dT \qquad (4)$$

The pressure correction term for a thermocouple circuit, the second term of equation (3), can therefore be determined by performing the single wire experiment for each material of the thermocouple pair.

The problem of simultaneous pressure gradient and temperature gradient which normally exists in a pressure seal and throughout a solid media device will modify this treatment. Equation 4 is still valid but the variation of $\Delta\alpha(p,T)$ has to be taken into account since the pressure is not constant over the temperature interval within the cell. Hanneman and Strong[1] have provided a means of approximating the amount of uncertainty involved when the simultaneous gradients exist. They approximate $\Delta\alpha(p,T)$ as $Ap(T)$ where A is a constant and $p(T)$ is the internal pressure written in terms of the temperature. This is possible since T and p are both functions of position within the cell and therefore one can be written as a function of the other. To