isochores are shown in the next slide (Slide #10). Slopes of the isochores were also read with a tangentometer. It was especially noted that the isochores are not straight lines. The slope of a given isochore, $(\partial P/\partial T)_v$, decreases with increasing pressure and temperature. Since the isochores are not straight lines, one can state that $(\partial P/\partial T)_v$ is not a function of volume alone. The quantity $T(\partial P/\partial T)_v + B$, where B is the Tait equation parameter B, was examined for a number of the hydrocarbons in this study and the results support the idea that $T(\partial P/\partial T)_v + B$ is solely a function of volume.

It can be shown from thermodynamics that: (Slide #11)

$$(\partial E/\partial v)_T = T(\partial P/\partial T)_v - P$$

and

$$(\partial E/\partial P)_T = - T(\partial v/\partial T)_P - P(\partial v/\partial P)_T$$

From these equations one can show that:

$$(\partial E/\partial v)_T = (\partial E/\partial P)_T = 0 \text{ when } P = T(\partial P/\partial T)_v.$$

The pressure for which $P = T(\partial P/\partial T)_v$ has been determined experimentally for some of the hydrocarbons in this study. For example, for PSU 87 this pressure is 8900 bars at 135° C. Since at this pressure $(\partial E/\partial v)_T$ and $(\partial E/\partial P)_T = 0$ it represents a minimum energy for the liquid. It has been proposed (by Bridgman and Hildebrand) that the volume of the liquid at this pressure should correspond to the volume of the liquid at 0°K. For PSU 87: (Slide #12)

Specific volume at P for which $P = T(\partial P/\partial T)_v$	0.99 cc/gram
Specific volume at 0°K (extrapolated from density data)	0.96 cc/gram