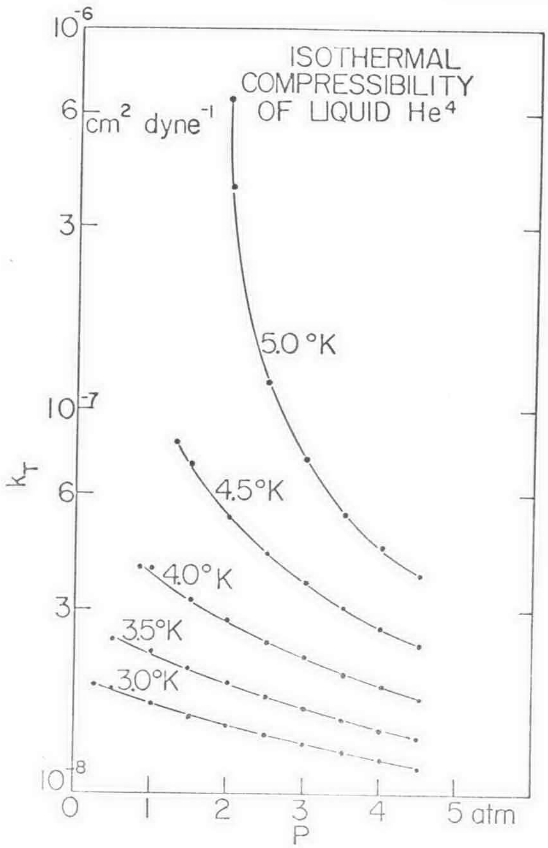

FIG. 3. Isothermal compressibility of liquid He^4 as a function of pressure along five isotherms. Along each isotherm the lowest pressure point corresponds to the saturated vapor pressure.

interpolated graphically to give a calculated $\mathscr{L}_0 = 0.58 \pm 0.02$ at 4.2° K. There is clearly excellent agreement with experiment here. Unfortunately, there is not good agreement with the calculations of $\mathscr{L}_0$ made earlier by Goldstein and Reekie (1955) and used extensively by them in their analysis of the structure of liquid He^4. At 4.2° K and the SVP, they calculated $\mathscr{L}_0 = 0.458$, which is well outside our limits of error. Tweet (1954) also calculated $\mathscr{L}_0$ at 4.16° K and the SVP and obtained approximately 0.61 ± 0.03* which agrees with our value. The earlier calculations were limited by the lack of direct measurements of the isothermal compressibilities of the liquid.

Egelstaff and London (1957) have calculated the expected zero-angle differential scattering cross section σ_s for slow neutrons scattered by liquid helium at the SVP, using, in effect,

$$\sigma_s = \left(\frac{5}{4}\right)^2 \frac{\sigma_f}{4\pi} \mathscr{L}_0 = 0.093 \mathscr{L}_0. \tag{4.1}$$

They took, σ_f, the free atom scattering cross section of helium, to be 0.75 barn (Sommers, Dash, and Goldstein 1955). At the highest temperatures

*Another unfortunate misprint in a "note added in proof" records this as 0.16.