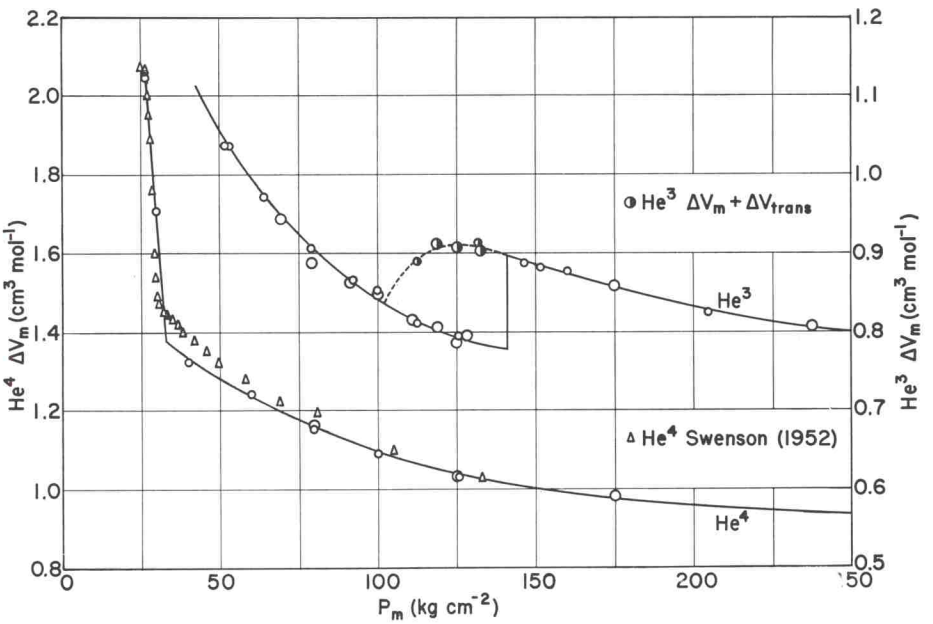

FIG. 2. The volume change on melting of He^3 and He^4 at low pressures. The large circles represent measurements made with the small, heavy-walled cell, while the small circles represent those made with the large, thin-walled cell.

dP_m/dT_m. Similar properties for He^3 are given in Table II. Maximum errors are estimated to be 0.5 percent for ΔV_m, 0.1 percent for V_f, and 1 percent for ΔS_m. In Table III are presented the melting parameters for the solid-solid transition of He^3. Results of the high-pressure, room-temperature gas-density determinations for He^4 and He^3 are given in Table IV.

As in the case of N_2 (*15*), the ΔV_m data were fitted to the equation

$$\Delta V_m = A - B \log_{10}(P_m + C) \tag{1}$$

by the method of least squares. For He^3 two sets of constants were needed—one for the region below the triple point and the other for the region above. It was not possible to fit the He^4 ΔV_m data to Eq. (1) over the full pressure range studied. However, for the purpose of interpolation, a fit was made from 175 to 3555 kg/cm^2. The constants in Eq. (1) for the various solids are presented in Table V. Listed also are the pressure range and rms deviation in ΔV_m.

The melting curve data at low pressure were fitted by the method of least squares to analytical expressions of the form,

$$P = A' + B'T + C'T^2 + D'T^3 + E'T^4. \tag{2}$$

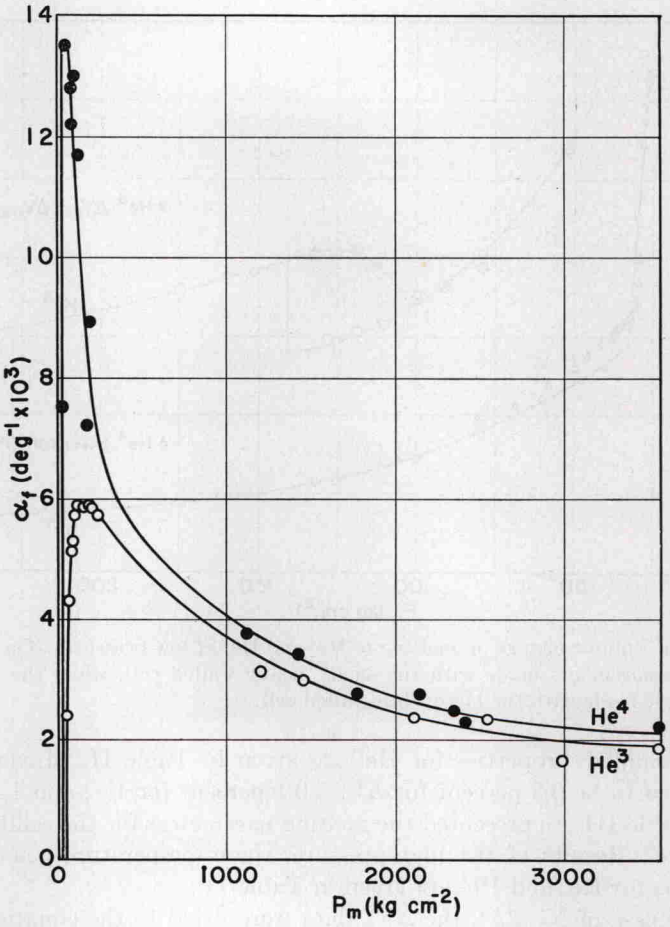

FIG. 3. The thermal expansion coefficient of fluid He^3 and He^4 along the melting curve.

For He^4 a fit was made only above the λ-point; for He^3 separate curves were fitted below and above the triple point. Fitted also to this equation were measurements of the solid-solid transition line in He^3. Constants in Eq. (2) for the various transitions are given in Table VI along with the temperature range covered and the rms deviation in P. The melting curves at higher temperatures and pressures are well represented by the constants given earlier (*1*) for the Simon equation,

$$P_m = a + bT_m{}^c. \tag{3}$$

Data for the molar volume of fluid along the melting curve could be repre-