

L_0 is the latent heat of vaporization at 0°K , $p_m\Delta V_m$ is the work done in solidifying the liquid at 0°K , and the two integrals give the work of compression in the liquid and the solid range, respectively. (V_1 is the volume of the liquid in equilibrium with its vapour, V_2 in equilibrium with the solid, and V_3 that of the solid in equilibrium with the liquid.)

TABLE 10

	p (Kg/cm ²)	V (cm ³ /mole)	U_0 (cal/mole)
liquid 0°K	0	36.63	-5.04
liquid 0°K	29	26.0	-2.6
b.c.c. solid 0°K	29	24.2	-1.8

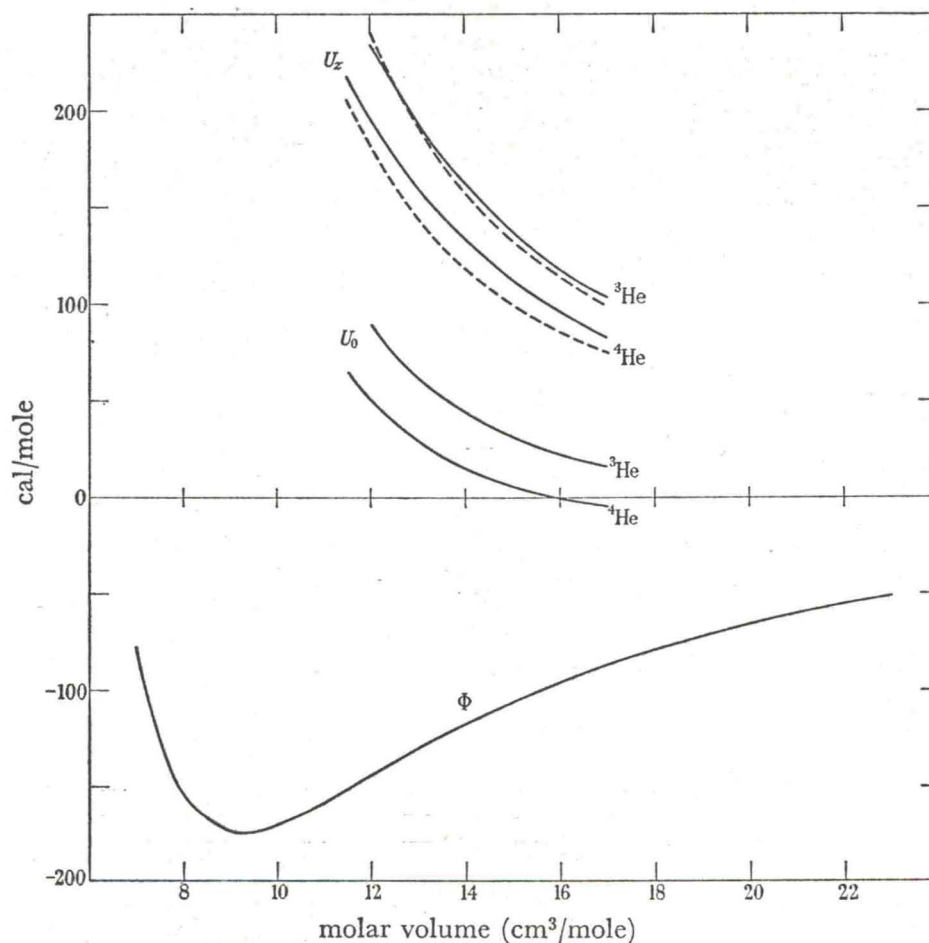


FIGURE 13. Energy relations at 0°K for solid ^4He and ^3He . U_z is the zero-point energy; U_0 is the internal energy at absolute zero; and Φ is the classical static lattice energy calculated from the de Boer-Michels potential. —, Experimental; -----, London (1954).

For ^4He we have taken Swenson's (1950) estimate for one value of U_0 . According to this, U_0 for the solid at the melting pressure is -11.9 cal/mole. In order to obtain U_0 for smaller molar volumes we have to calculate the work of compression according to equation (11). This information is known from the present experiments between 17.0 and 11.5 cm³/mole. Up to $V = 17$ cm³/mole we have used an extrapolation of the isotherm at 0°K . This extrapolation gives $U_0 = -5.07$ cal/mole for $V = 17.0$ cm³/mole.