observed. Because of this effect the accuracy in this range is reduced and is not better than a few parts per cent.

As already described in §2·4, the *starting* temperature of the melting range could be obtained by taking heating curves. Because of the extremely large thermal relaxation time near the end of the melting range this method was not feasible to determine the temperature of the *end* of the melting range. This temperature, however, could be calculated in an obvious way from an apparent specific heat measured over a heating interval that included the end of the melting range and part of the fluid range. This method when used for the determination of the temperature of the start of the melting interval gave agreement with the more direct observation from heating curves to within 0·002 degK on the average.

The experimental results of the apparent specific heat in the melting range were used to calculate the change in internal energy and in entropy over the melting range and are dealt with in §3·5.

3·3. *The high-temperature phase transformation in solid* ^{4}He *and* ^{3}He

Both helium isotopes exhibit at high pressures a phase transition from a hexagonal close-packed to a face-centred cubic structure (Dugdale & Simon 1953; Mills & Schuch 1961; Schuch & Mills 1961). In the course of the present investigation this transition was observed at one molar volume in ^{4}He and at two molar volumes in ^{3}He. A preliminary account of the results on ^{3}He has been already given elsewhere (Franck 1961). For each sample investigated the transition temperature and the latent heat of transition were determined in the way described below. The results are given in table 3. The numerical data differ slightly from the ones given by Franck (1961) because of the corrections made to the temperature scale as described in §2·2 and because of an error regarding the pressure unit in that paper.

TABLE 3. PROPERTIES OF THE h.c.p.–f.c.c. TRANSITION IN ^{3}He AND ^{4}He

sample	$T_{tr.}$ (°K)	L (cal/mole)	$p_{tr.}$ (Kg/cm^2)	ΔS (cal mole^{-1} deg^{-1})	ΔV (cm^3/mole)
no. 1, ^{3}He	17·818	0·068	1629·1	0·0038	$1·4 \times 10^{-4}$
$T_m = 17·964$ °K					
$p_m = 1631·5$ Kg/cm^2					
$V = 11·70$ cm^3/mole					
no. 2, ^{3}He	17·896	0·067	1717·5	0·0037	$1·4 \times 10^{-4}$
$T_m = 18·688$ °K					
$p_m = 1730·7$ Kg/cm^2					
$V = 11·56$ cm^3/mole					
no. 3, ^{4}He	15·010	0·060*	1305·7	0·005†	4×10^{-4}†
$T_m = 16·419$ °K					
$p_m = 1327·4$ Kg/cm^2					
$V = 11·77$ cm^3/mole					

* ΔE.   † Data from Dugdale & Simon (1953).

The transition temperature was obtained from heating curves at constant energy input which showed a pronounced kink. The transition temperature was taken at the point where the heating curve first deviates from a straight line. Because of thermal and instrumental relaxation it was not possible to observe the natural width of the transition. The latent heat was obtained by making measurements of the apparent specific heat C_v^*, for a temperature interval that included the complete transition. As it was observed that the specific