temperature of onset of melting. The corresponding values of C_v obtained in this way are tabulated for the actual molar volumes investigated in tables 1 and 2.

The earlier measurements of Dugdale & Simon (1953) agree with the present results to within 2% of C_v near the melting line. With falling temperatures Dugdale & Simon's results become progressively larger than the present ones and at 5 °K the discrepancy in C_v is about 15%. Their measurements did not show the marked rise in θ_D with falling temperature observed here; this rise is, however, in agreement with the results of Keesom & Keesom (1936) at higher molar volumes.

TABLE 1. THERMODYNAMIC FUNCTIONS FOR SOLID ^{4}He AT ROUNDED VALUES OF TEMPERATURE

	V = 16·25			14·55			12·22			11·77		
T (°K)	C_v	$U-U_0$	S	C_v	$U-U_0$	S	C_v	$U-U_0$	S	C_v	$U-U_0$	S
3	0·128	0·0914	0·040	0·0506	0·0363	0·0160	0·0136	0·0099	0·0044	0·0106	0·0077	0·0034
4	0·333	0·310	0·102	0·132	0·123	0·0404	0·0348	0·0328	0·0108	0·0265	0·0254	0·0084
5	0·697	0·811	0·212	0·279	0·322	0·0842	0·0742	0·0855	0·0224	0·0559	0·0652	0·0172
6	—	—	—	0·507	0·708	0·154	0·138	0·189	0·0412	0·105	0·144	0·0313
7	—	—	—	0·816	1·36	0·254	0·232	0·372	0·0692	0·177	0·282	0·0525
8	—	—	—	—	—	—	0·358	0·665	0·108	0·275	0·506	0·0823
9	—	—	—	—	—	—	0·515	1·10	0·159	0·399	0·840	0·122
10	—	—	—	—	—	—	0·700	1·70	0·223	0·549	1·31	0·171
11	—	—	—	—	—	—	0·907	2·50	0·299	0·721	1·95	0·231
12	—	—	—	—	—	—	1·13	3·52	0·387	0·909	2·76	0·302
13	—	—	—	—	—	—	1·37	4·77	0·487	1·11	3·77	0·383
14	—	—	—	—	—	—	1·61	6·26	0·597	1·32	4·98	0·472
15	—	—	—	—	—	—	—	—	—	1·53	6·40	0·571
16	—	—	—	—	—	—	—	—	—	1·75	8·04	0·676

Units: V (cm^3/mole); C_v (cal mole^{-1} deg^{-1}); $U-U_0$ (cal/mole); S (cal mole^{-1} deg^{-1}).

Heltemes & Swenson (1961, 1962) have made measurements on solid ^{3}He and ^{4}He over a range of densities similar to those studied by us but at temperatures between 0·3 and about 1·5 °K. Their results will be discussed more fully in § 4·1 below. At this point it is sufficient to note that they found no evidence of any specific heat anomaly which could be attributed to the nuclear spins in ^{3}He. If the nuclear spins were interacting appreciably one would expect to see an anomaly in the specific heat corresponding to the decrease in entropy from $R\ln 2$ towards zero as the temperature falls. At the high temperature side of such an anomaly the specific heat from this source would be expected to vary as $1/T^2$. Since no such term was detected we shall assume that in solid ^{3}He the spins contribute their maximum entropy ($R\ln 2$) at all the temperatures and densities which concern us here.

3·2. *The melting range*

Melting of the helium samples took place over a finite temperature interval since the volume was kept constant. Within the melting range the measured apparent specific heat depends on the specific heat of the solid and of the fluid, and on the latent heat of melting. The thermal relaxation time is much longer in this range than either in the solid or in the fluid range and it increases considerably towards the high temperature end of the melting range. This is probably due to the fact that the large latent heat of melting has to be transferred through the poorly conducting liquid. Equilibrium times of up to 20 min were