TABLE II. Thermal expansion coefficient of He^4 ($10^{-3}\,°K^{-1}$).

T(°K) \ P(atm)	0.493	0.996	2.70	5.06	8.00	10.01	13.00	15.01	17.97	20.10	22.08	24.93	27.10	28.00
1.25	...	...	...	...	...	−3.00	−3.63	−4.18	−4.73	−5.53	−5.73	−6.13	in solid	in solid
1.30	−0.88	−1.15	−1.79	−2.69	−3.39	−3.79	−4.64	−5.09	−5.90	−6.40	−7.39	−8.70	in solid	in solid
1.35	−1.39	−1.70	−2.47	−3.26	−4.10	−4.68	−5.49	−6.07	−7.15	−7.94	−8.71	−9.83	in solid	in solid
1.40	−1.89	−2.06	−2.82	−4.06	−5.04	−5.94	−6.63	−7.29	−8.65	−9.48	−10.68	−11.86	in solid	in solid
1.50	−2.73	−3.10	−4.32	−5.73	−7.12	−8.07	−9.71	−11.10	−12.37	−14.68	−15.69	−19.0	in solid	in solid
1.60	−3.79	−4.39	−6.14	−7.79	−10.21	−11.18	−13.62	−15.27	−17.8	−19.8	−22.1	−28.3	(−35.8)	in solid
1.70	−5.22	−6.15	−8.32	−10.85	−14.41	−15.5	−19.1	−21.7	−25.8	−29.6	−34.6	−43.0	−52.5	−65.5
1.80	−7.16	−7.98	−11.01	−14.54	−18.82	−21.7	−27.0	−30.0	−36.6	−45.1	−54.2	−75.1	−116.4	−34.8
1.90	−9.38	−10.7	−15.1	−19.8	−25.2	−29.8	−38.5	−45.6	−61.8	−77.5	−21.8	−1.5	+2.0	+2.7
2.00	−12.9	−14.4	−19.6	−26.6	−35.3	−46.3	−65.2	−27.9	−2.3	+1.6	+4.4	+6.4	+7.2	+8.5
2.10	−18.7	−22.0	−31.0	−48.0	−12.5	0.0	+3.6	+5.4	+7.8	+8.7	+9.2	+9.8	+9.4	+10.6
2.20	+12.3	+11.8	+12.5	+9.7	+10.7	+10.7	+10.3	+11.0	+10.8	+11.9	+11.5	+11.9	+11.5	+11.9
2.30	+27.0	+25.0	+20.6	+18.5	+16.3	+15.3	+14.1	+13.8	+13.4	+12.6	+13.3	+12.9	+12.9	+12.9
2.40	+33.1	+31.9	+27.0	+23.2	+19.9	+18.6	+16.5	+16.2	+15.5	+15.4	+14.7	+13.7	+13.9	+13.9
2.50	+38.9	+37.2	+32.1	+27.0	+23.2	+21.4	+18.5	+18.4	+17.2	+16.3	+15.6	+14.6	+15.0	+14.7
2.70	+50.8	+48.0	+39.3	+33.0	+27.7	+25.1	+22.4	+21.0	+19.6	+19.0	+17.4	+16.5	+16.3	+16.0
3.00	+64.1	+61.0	+51.6	+40.3	+33.8	+30.0	+27.2	+24.4	+22.2	+21.1	+20.5	+19.1	+18.6	+18.1
3.20	+78.7	+72.0	+57.7	+46.0	+38.1	+33.6	+29.7	+26.7	+24.4	+23.5	+21.7	+20.3	+19.8	+18.9
3.50	+101.3	+92.8	+70.4	+54.1	+43.2	+38.9	+33.4	+31.0	+27.8	+25.8	+24.7	+22.4	+21.5	+21.1
3.80	in gas	+119.5	+84.0	+64.5	+49.3	+44.5	+37.4	+34.5	+30.7	+28.2	+26.7	+25.0	+23.0	+23.3
4.00	in gas	+153.6	+101.0	+73.0	+53.6	+47.5	+39.3	+37.0	+32.8	+29.2	+28.6	+26.5	+24.0	+24.8

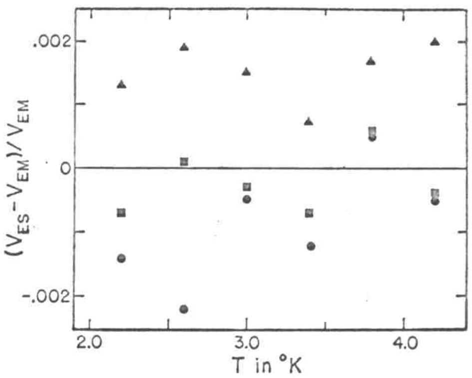

FIG. 3. Relative difference of the molar volumes measured by Edeskuty and Sherman[10] (V_{ES}) and by the present authors (V_{EM}). Black circles: 1 atm, black squares: 10 atm, black triangles: 25 atm.

second one gives the detailed results near the transition and a comparison with relevant work.

A. The Broad Range: 1.25 to 4.2°K

Our molar-volume results are presented at standard temperatures in Table I for all the isobars that we have studied. These values were obtained from curves drawn through the data by hand and the scatter was no more than 0.001 cm^3/mole even though the data were always taken in two long passes, first cooling and then warming, and frequently were taken on more than one day. It is because of this high relative accuracy along a given isobar that we have chosen to present the data without smoothing them, which would otherwise have removed a significant figure. This significant figure, however, is in relative accuracy; absolute values are known only to ±0.1%. It is particularly interesting that along successively higher isobars the decrease of V with increasing T below T_λ becomes considerably greater, and the displacement of the volume minimum from T_λ becomes larger, while the subsequent increase of V with T becomes smaller. We have compared our results at 0.996, 10.01, and 24.93 atm with those of Edeskuty and Sherman[10] (corrected by −0.3%) at 1, 10 and 25 atm, respectively. The relative difference, $(V_{ES}-V_{EM})/V_{EM}$, is plotted in Fig. 3. Corrections for the slight pressure differences do not effect the points noticeably. There is a slight systematic difference between the two sets of data but it does not exceed the combined uncertainties so that the results are basically in agreement. Also there is agreement between our results at 1.3°K and those of Boghosian and Meyer[14] to within the combined uncertainties.

The α_P results are given in Table II at regular temperatures for the various isobars. The estimated error is 3% or $0.3\times10^{-3}\,°K^{-1}$, whichever is greater. Figure 4 shows a comparison of the various results at low temperatures. There is also reasonable agreement with the

[14] C. Boghosian and H. Meyer, Phys. Rev. **152**, 200 (1966); **164**, 205(E) (1967).