TABLE III. Entropy of compression of liquid He^4 ($mJ/g°K$). For explanation for those isotherms that pass through T_λ, see text.

T(°K) \ P(atm)	1	2	5	10	15	20	24	25	28
1.30	0.60	1.51	5.67	16.1	30.0	47.4	64.7	69.7	...
1.40	1.27	2.88	9.56	25.4	46.0	71.3	96.0	102.9	...
1.50	1.92	4.33	13.9	36.3	65.8	103.4	140.8	151.5	...
1.60	2.71	6.15	19.7	51.1	92.3	144.5	197.2	212.0	...
1.70	3.62	8.25	27.8	70.0	127.6	204.0	284.0	308.0	396.0
1.80	4.81	10.9	35.4	93.8	174.1	284.0	409.0	449.0	0
1.90	6.33	14.5	47.6	126.0	241.1	418.0	0	1.39	−1.59
2.00	8.65	19.6	63.5	174.5	0	17.2	7.7	4.05	−8.75
2.10	12.4	29.3	102.4	0	−10.65	−32.4	−53.5	−59.02	−76.3
2.20	−7.77	−15.9	−39.0	−74.0	−107.25	−140.3	−166.9	−173.53	−193
2.30	−17.3	−33.4	−73.6	−126.7	−171	−210	−240	−248	−270
2.40	−20.9	−41.6	−94.0	−160.1	−212	−258	−293	−301	−325
2.50	−24.2	−48.8	−110.4	−187	−247	−298	−335	−334	−370
2.70	−30.1	−61.2	−136.6	−229	−300	−359	−400	−410	−438
3.00	−34.4	−74.5	−170.1	−284	−370	−438	−486	−497	−530
3.20	−37.4	−85.2	−196	−325	−420	−495	−547	−559	−594
3.50	−38.3	−100.5	−236	−388	−497	−583	−641	−655	−693
3.80	−32.4	−112.3	−278	−456	−581	−678	−742	−757	−799
4.00	−22.8	−126.8	−325	−522	−656	−758	−827	−842	−887

results of Grilly and Mills[5] although for the 1.3 and 1.4°K points they give values somewhat below our curves. On the other hand, while there is better than order-of-magnitude agreement with Mills and Sydoriak[15] there is a basic difference in that the slope of their isotherm would seem to decrease monotonically with pressure while our isotherms show an initial decrease followed by an increase at high pressures. The only comment that we would make on this is that our form is consistent with results along isotherms that pass through the λ line and hence must have a negative

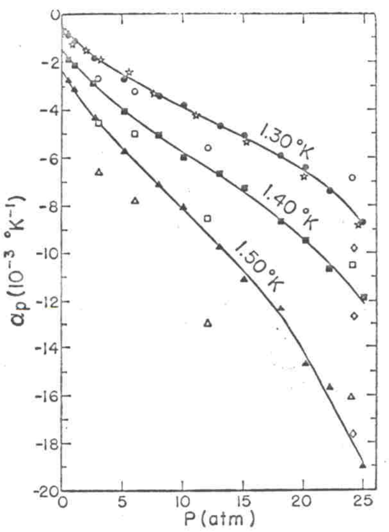

FIG. 4. Thermal expansion coefficient of He^4 along the 1.30, 1.40, and 1.50°K isotherms. The closed symbols are the present results, the corresponding open symbols are the results of Mills and Sydoriak (Ref. 15). The diamonds are the results of Grilly and Mills (Ref. 5), given at 24 atm at these same temperatures. The stars are the results of Boghosian and Meyer (Ref. 14) at 1.30°K.

[15] R. L. Mills and S. G. Sydoriak, Ann. Phys. (N. Y.) 34, 276 (1965).

singularity. Finally, while we do not give their points, our results extrapolate quite well to the vapor-pressure results of Kerr and Taylor[4] and of Atkins and Edwards.[1]

We have calculated the entropy of compression from our data by graphically determining areas for

$$S(T,P)-S(T,P_0)=-\int_{P_0}^{P}\left(\frac{\partial V}{\partial T}\right)_P dP. \qquad (3)$$

These values are given in Table III, where it should be noted that P_0 is the saturated vapor pressure except for those regions that can not be reached along isotherms without crossing the λ line. In this last case P_0 is the lowest pressure above the transition for which data are given. The uncertainties in the integration probably

TABLE IV. The change of compressibility with temperature at standard pressures (10^{-4} atm^{-1}). The values given are $k_T-k_{1.3°K}$ for $T<T_\lambda$ (ordinary numerals), and $k_T-k_{2.2°K}$ for $T>T_\lambda$ (italic numerals). Values in parentheses are considered uncertain.

T(°K) \ P(atm)	1	5	10	13	15	20	25
1.30	0	0	0	0	0	0	0
1.40	0.49	0.36	0.28	0.28	0.31	0.39	0.68
1.50	1.12	0.85	0.68	0.69	0.79	0.97	1.70
1.60	1.98	1.53	1.25	1.31	1.47	1.88	3.43
1.70	3.14	2.46	2.05	2.21	2.48	3.46	6.47
1.80	4.70	3.70	3.26	3.55	4.03	6.34	12.84
1.90	6.87	5.33	5.25	5.96	6.90	(12.5)	*1.82*
2.00	10.05	7.65	(9.1)	11.22	*large*	*0.99*	*0.45*
2.10	(14.8)	(12.7)	*(0.95)*	*0.45*	*0.34*	*0.22*	*0.07*
2.20	*0*	*0*	*0*	*0*	*0*	*0*	*0*
2.30	*1.48*	*0.52*	*0.17*	*0.06*	*0.02*	*0.00*	*−0.03*
2.40	*4.11*	*1.62*	*0.70*	*0.40*	*0.26*	*0.14*	*0.01*
2.50	*7.52*	*3.18*	*1.45*	*0.92*	*0.65*	*0.40*	*0.08*
2.70	*16.02*	*7.32*	*3.46*	*2.34*	*1.77*	*1.14*	*0.48*
3.00	*33.95*	*15.74*	*7.50*	*5.25*	*4.04*	*2.58*	*1.41*
3.20	*50.28*	*22.75*	*10.80*	*7.61*	*5.91*	*3.76*	*2.22*
3.50	...	*35.70*	*16.69*	*11.75*	*9.23*	*5.90*	*3.72*
3.80	...	*52.75*	*23.70*	*16.55*	*13.17*	*8.49*	*5.47*
4.00	...	*67.54*	*29.25*	*20.24*	*16.21*	*10.45*	*6.75*