

TABLE 2. EXPERIMENTAL RESULTS

Temp. °F.	Pressure lb./sq.in. abs.	Uncorrected $h^o - h^p$ B.t.u./lb.	Temp. Correction B.t.u./lb.	Pressure Correction B.t.u./lb.	$(h^o - h^p)_T$ B.t.u./lb.	$(H^o - H^p)_T$ B.t.u./lb.-mole
methane						
150	500	11.258	0.026	0.112	11.40	182.8
150	1,000	22.267	-0.076	0.533	22.72	364.5
150	1,500	33.075	-0.178	0.809	33.71	540.7
150	2,000	42.857	0.174	0.283	43.31	694.8
5.1 mole % propane in methane						
90	500	13.973	-0.026	0.472	14.42	254.1
90	1,000	29.242	-0.099	0.793	29.94	527.5
90	1,500	45.256	-0.049	1.051	46.26	815.1
90	2,000	58.276	0.169	1.557	60.00	1,057.2
150	500	12.189	-0.062	0.354	12.48	219.9
150	1,000	23.733	-0.054	0.596	24.28	427.7
150	1,500	35.191	-0.017	0.898	36.07	655.6
150	2,000	43.135	0.052	1.151	44.34	781.2
200	500	13.709	-0.216	0.471	13.96	246.0
200	500	12.161	-0.072	0.496	12.59	221.8
200	500	9.021	-0.023	0.528	9.53	167.9
200	500	9.382	-0.066	0.528	9.85	173.5
200	500	9.830	-0.180	0.528	10.18	179.3
200	500	10.135	-0.185	0.528	10.48	184.6
200	1,000	23.945	-0.088	0.491	24.35	429.0
200	1,000	17.921	0.152	0.894	18.97	334.2
200	1,000	18.726	-0.158	0.889	19.46	342.8
200	1,500	28.219	-0.083	0.733	28.87	508.7
200	2,000	34.912	-0.101	0.972	35.78	630.5
200	2,000	34.785	-0.224	0.976	35.51	625.7
12.6 mole % propane in methane						
90	500	15.904	0.112	0.868	16.88	334.9
90	1,000	32.488	-0.002	0.885	35.37	701.6
90	1,500	52.826	-0.020	1.309	54.11	1,073.3
90	2,000	70.154	-0.150	1.538	71.54	1,419.0
150	500	13.611	-0.092	0.619	14.14	280.4
150	1,000	26.682	0.016	0.605	27.30	541.6
150	1,500	51.834	-0.055	0.874	42.65	846.0
150	2,000	53.053	0.124	1.144	54.32	1,077.4
200	500	10.799	0.008	0.561	11.37	225.5
200	2,000	42.749	0.106	0.978	43.83	869.4
200	1,500	34.516	-0.262	0.734	34.99	694.0
200	1,000	22.685	0.024	0.525	23.23	460.9

tions. These corrections normally amount to about 3% of the reported values. The final corrected results are the difference between the ideal and real gas enthalpies.

Early experimental measurements showed deviations from the mean for duplicate runs to be a maximum of 2.3 B.t.u./lb. However, refinements in experimental technique on later runs (the 12.6% propane runs) led to improved results, believed to be precise to within  $\pm 1$  B.t.u./lb.

#### COMPARISONS

Comparisons of the above results with values from other sources are given in Figures 2 through 8. The points labeled Yarborough are from a calculational treatment (15) of the volumetric data of Sage and Lacey (14). Budenholzer, et al. (3) points refer to enthalpies from Joule-Thomson measurements. Edmister points are from a Mollier chart for methane (6), based on data from multiple sources. The Manker (10) and Mather, et al. (11) points are from a companion project to the present study performed at the University of Michigan.

An examination of Figures 2 through 8 reveals that the

observed  $\Delta h$  values at 2,000 lb./sq.in.abs. are higher than Yarborough's derived  $\Delta h$  for methane at 150°F. but lower for the 94% methane at 90, 150, and 200°F. For the 86% methane system, the agreement is very good, however. There is no apparent explanation for this inconsistency.

The  $\Delta h$  values of Manker and Mather were read from their published Mollier charts (11). Figures 3, 6, and 7 show that values from these Mollier charts diverge appreciably at high pressures from the present data. Minor differences between the mixture compositions used in the present work and those of Manker and Mather cannot account for the divergence noted in the figures. However, an important fact, relative to these comparisons, is that the data taken by Manker and Mather were isobaric data. They employed Budenholzer's Joule-Thomson data to establish the effect of pressure on enthalpy for their Mollier charts. This required extrapolation of Budenholzer's data above 1,500 lb./sq. in. abs. Thus, the above comparisons should not be construed to be a direct comparison of the experimental data of Manker and Mather with the present data.