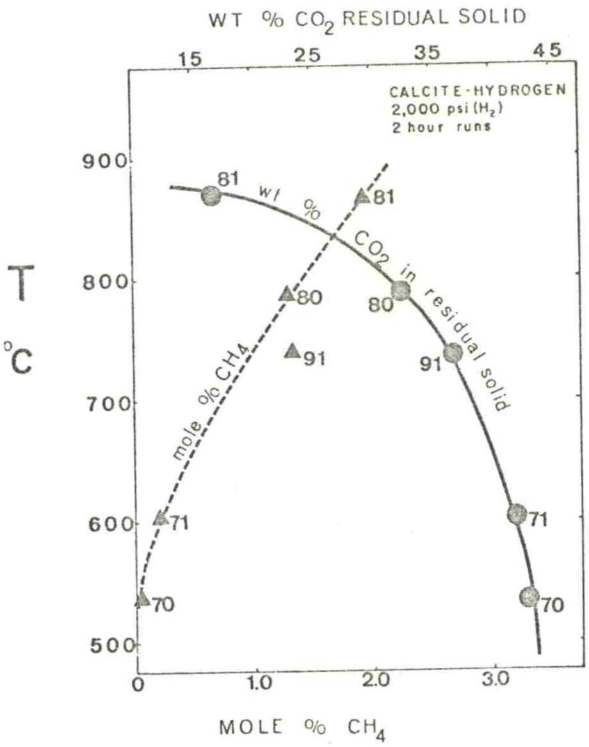

FIG. 5. In the calcite-hydrogen system, plot of mole % CH_4 generated and residual CO_2 remaining as calcite in experiments run for 2 hours; 2000 psi (H_2); at 535, 605, 735, 790, and 870°C.

Analysis of the reaction gases shows that the reaction compounds are restricted in number even though a large population of compounds are possible in the C-H-O system. The gases present are the following: CH_4; C_2H_6; H_2O; CO; and CO_2. The latter two appeared in only one experiment (no. 75). This experiment was unique in that the original hydrogen pressure was only 200 psi.[1] The appearance of CO and CO_2 at low pressures may be explained, at least in part, through thermodynamic calculations for a simplified C-H-O gaseous system (French, 1966). These calculations show that decreasing pressure favors the formation of CO_2 and water relative to methane and are in agreement with our experimental findings.

It appears that methane and, if within the stability field, homologues of methane, form directly rather than from reactions between hydrogen

[1] Fugacities vary with pressure, consequently the proportion of each substance present in the equilibrium will also vary with pressure.