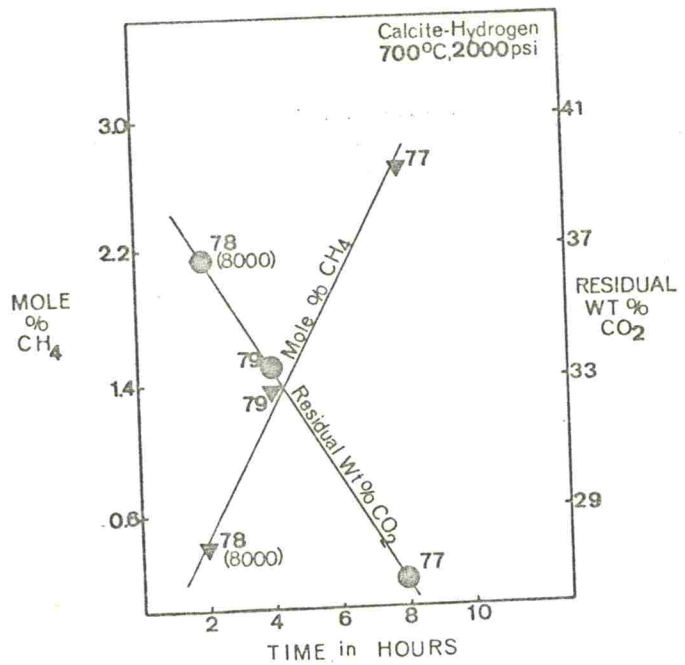

FIG. 6. Plot of calcite-hydrogen system showing mole % CH_4 generated and residual CO_2 remaining as calcite in experiments run at 700°C; 2000 psi (H_2) exp. no. 77, 79 and 8000 psi (H_2) exp. no. 78; for 8, 4, and 2 hours respectively.

run at 605°C and 2000 psi $P(H_2)$ for 2, 4, 8, 16 hours respectively is shown in Figure 3. The deviation from linearity is not excessive, and the agreement of the calculated rate constants for the same experiments is within the experimental error (Table 2). Both evaluations support the assumption of a pseudo-first-order reaction.

TABLE 2. CALCITE-HYDROGEN AT 605°C, 2000 PSI $P(H_2)$

t (hours)	Wt % CO_2[a] remaining in solid	k (hour^{-1})
2	42.0	0.019
4	41.0	0.016
8	37.8	0.018
16	34.2	0.015
		mean = 0.017

[a] Initial CO_2 Wt % is 43.7.

The Arrhenius equation:

$$\frac{d \ln k}{d T} = \frac{E_a}{RT^2}$$

can be used with the data from experiments 71
variation of the rate constants with temper
Arrhenius apparent energy of activation (E_a)

Figure 7 is a plot of the Arrhenius equati
ments nos. 70, 71, 91, 80, and 81. The press
(2 hours) were common to all experiments. T
605°C, 735°C, 790°C, and 870°C respectivel
energy is calculated from the linear portion
The Arrhenius equation: $d \ln k/dT = E_a/R$

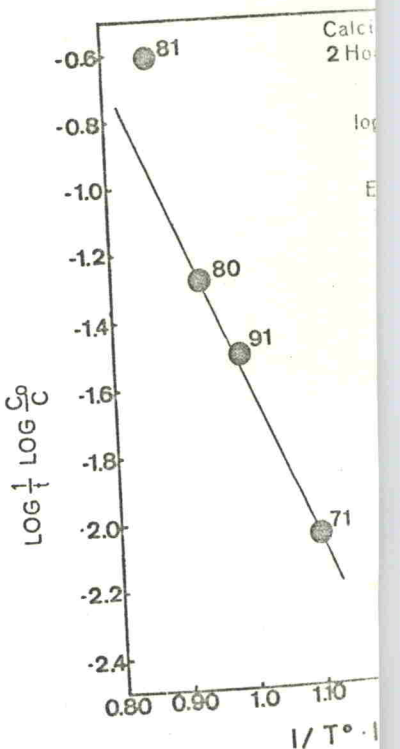

FIG. 7. Plot of $\log(1/t \log C_0/C)$ or $\log k$ against
ture for experiments numbered 70, 71, 92, 80, and
psi (H_2); 2 hours; at 535, 605, 735, 790, and 870
energy calculated from the slope of experiments 71,