after which the temperature was allowed to fall. Approximately 150 to 200 grams out of the total charge of 600 grams was consumed before the desired conditions of operation were fixed.

Thus the recoveries are low for pressure reactions, and the error is rather considerable with low temperatures and high pressures. These effects should be thoroughly understood in considering the yields obtained. For comparative purposes the results as recorded are of great value and clearly indicate what can be done. At the time of the public demonstration at Columbia University, those present were shown clearly the possibility of making gasoline without evolving gas, once the pressure had been built up. The high concentration of end-product gases in the reaction zone is sufficient to prevent further formation of these undesirable products. With regard to the modern dynamic conception of chemistry, it may be said that the evolved gas enters into chemical union as fast as it is formed; that is, a state of equilibrium exists.

The percentages of recovered oil on the basis of the original oils are given in Table 10, and the average percentages are assembled in Table 11.

TABLE 10.—*Results of cracking various original oils, showing percentage, by weight, of oil recovered.*

Furnace conditions.		Percentage, by weight, recovered from original oils from—				Average percentage recovered.
Temperature.	Pressure.	Pennsylvania.	Oklahoma.	California.	Mexico.	
° C.	*Atmospheres.*					
850	1	9.7	.....	.....	.....	9.7
850	(a)	.....	23.1	34.2	.....	28.6
800	(a)	.....	29.3	43.7	.....	36.5
750	12	15.9	20.2	21.1	.....	19.1
750	6	16.9	22.2	20.9	.....	20.0
750	1	16.5	17.5	20.9	.....	18.3
750	(a)	33.9	51.7	47.4	37.3	42.6
650	(a)	.....	88.7	.....	.....	88.7
600	24	37.3	33.9	31.6	.....	34.2
600	18	40.5	35.6	33.7	.....	36.6
600	12	43.6	62.2	52.5	47.2	51.4
600	6	31.4	37.3	43.9	.....	37.5
600	1	59.9	50.8	46.6	40.2	49.4
600	(a)	97.4	100.0	81.8	66.0	85.0
550	24	.....	38.1	40.6	.....	39.3
550	18	.....	55.0	.....	.....	55.0
500	24	72.5	63.8	53.6	.....	63.3
500	18	79.4	.....	.....	.....	79.4
500	12	84.2	88.2	64.8	54.5	72.9
500	6	57.8	91.8	71.5	.....	73.7
500	1	94.5	99.0	91.3	72.8	89.4
500	(a)	100.0	99.8	73.6	.....	91.1
450	18	.....	76.9	.....	73.5	75.2
450	12	93.1	87.7	75.4	.....	85.4
400	10	.....	.....	.....	.....	.....

a Vacuum.

TABLE 11.—*Summary of results of cracking four oils, showing variations in oil recovered under various conditions of temperature and pressure.*

Pressure.	Percentage of oil recovered at temperature of—							
	450° C.	500° C.	550° C.	600° C.	650° C.	750° C.	800° C.	850° C.
Atmospheres.								
(a)	.....	91.1	.....	85.0	88.7	42.6	36.5	28.6
1	.....	89.4	.....	49.4	.....	18.3	.....	9.7
6	.....	73.7	.....	37.5	.....	20.0	.....	.....
12	85.4	72.9	.....	51.4	.....	19.1	.....	.....
18	75.2	79.4	55.0	36.6	.....	.....	.....	.....
24	.....	63.3	39.3	34.2	.....	.....	.....	.....

a Vacuum.

Differences in the original oils, whether of a physical or chemical nature, seem to have had little influence on the recoveries. It is shown

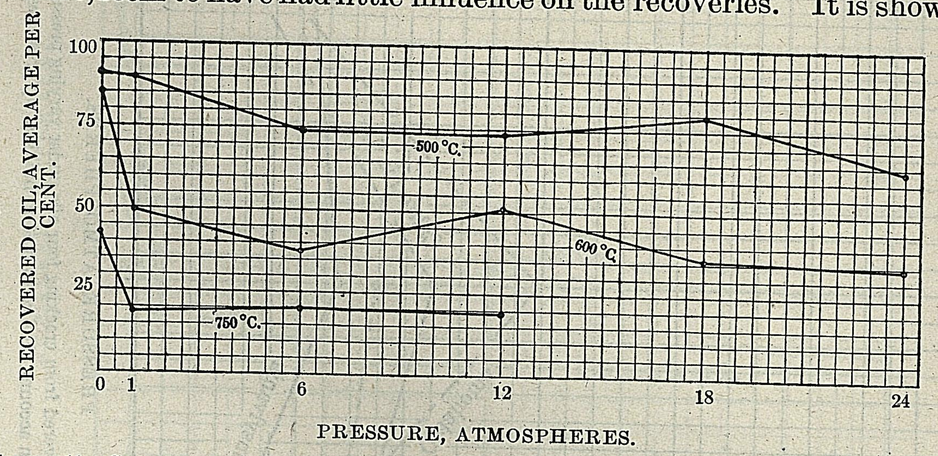

FIGURE 11.—Curves representing average results of cracking four oils, showing influence of varying temperatures and pressures on quantity of oil recovered on basis of original oil. Results for higher pressures low on account of oil consumed in building up pressures.

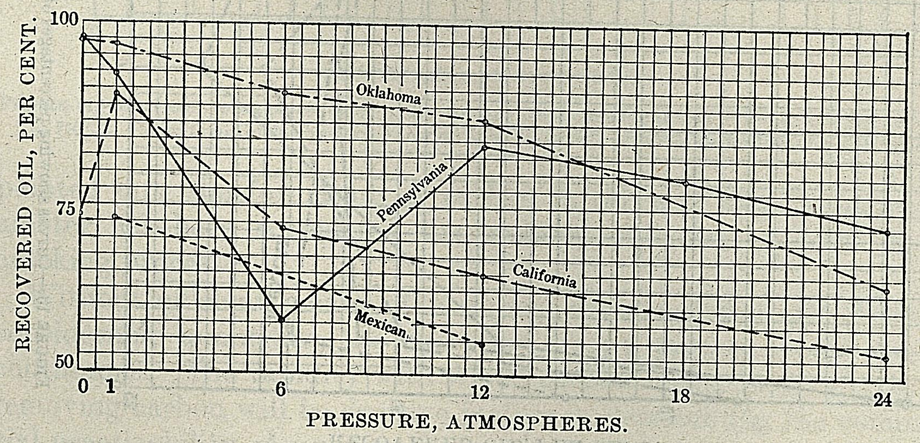

FIGURE 12.—Curves showing percentages of oil recovered from cracking four oils under varying pressures at 500° C. Results for higher pressures low on account of oil consumed in building up pressures.

clearly and is brought out by figure 11 that the percentage of recovery decreases with increase of temperature. There seems to have been no characteristic variation among the original oils, for the maximum