TABLE 20.—*Results of cracking four oils, showing effects of temperature and pressure on average percentage of gasoline formed.*[a]

Pressure.	Percentage of gasoline formed at temperature of—							
	450° C.	500° C.	550° C.	600° C.	650° C.	750° C.	800° C.	850° C.
Atmospheres.								
(b)		1.1		3.6	3.0	5.1	7.2	4.5
1		4.9		11.2		4.7		2.3
6		8.7		13.3		6.7		
12	7.5	13.7		12.9		8.1		
18	9.4	14.6	17.3	15.1				
24		15.2	12.3	12.3				

[a] Results for higher pressures low, owing to oil consumed in building up pressure.
[b] Vacuum.

COMMENTS ON RESULTS OF CRACKING OILS TO OBTAIN GASOLINE.

The ease with which the gasoline process can be operated and its freedom from mechanical difficulties makes the highly favorable results shown by these experiments of fundamental interest to refiners and to that part of the public desiring a cheap and satisfactory motor fuel.

In considering the percentages of gasoline formation presented in Table 19 the reader should remember that the small quantities of oil used for each experiment, and the necessity of consuming a relatively high percentage of the charge to build up pressures, made the yield of gasoline much lower than can be expected in large-scale operations in which such losses would be so minimized as to be almost negligible.

In addition, condensation was by no means as efficient as that which would be obtained in large-scale operations. The results from the use of the larger tubes indicated that a considerable percentage of the lighter and more volatile liquid products were mechanically carried over by the fixed or permanent gases, and hence were lost so far as the recovered oil was concerned.

The most noticeable feature of the results presented is the agreement in the values for the various oils used for the respective temperatures and pressures. Here again it is evident that differences in the original oils are of secondary importance as compared with the effect of conditions of temperature and pressure.

As would be expected, the higher temperatures, for example 700° C., were distinctly unfavorable for gasoline formation. The degree of formation of the end products, carbon and gas, is too great. The results presented in the table indicate that temperatures ranging between 500° and 600° C., preferably in the neighborhood of 550° C., are most favorable for gasoline formation. Further experiments with

large-size tubes have confirmed this indication. Figure 26, showing the curves of average percentages of gasoline formation for the oils used, clearly indicates the favorable range of temperature of the process.

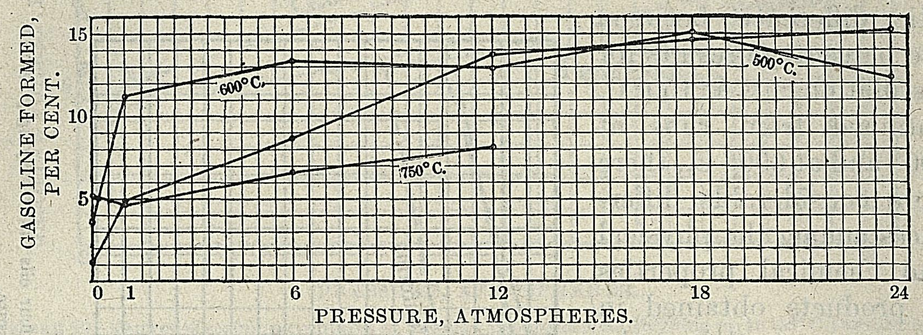

FIGURE 26.—Curves representing average results of cracking oils, showing influence of varying temperatures and pressures on formation of gasoline (hydrocarbons distilling up to 150° C.). Results for higher pressures low, owing to oil consumed in building up pressure.

Figures 27, 28, and 29 give the percentages of gasoline formed from the Pennsylvania, Oklahoma, and California oils at constant temperatures of 500°, 600°, and 750° C., and at varying pressures. That high pressures are favorable for the desired reactions is clearly indi-

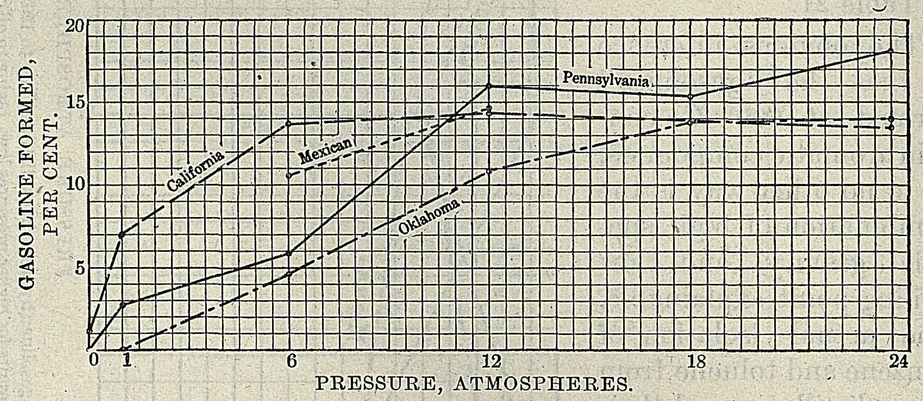

FIGURE 27.—Curves showing percentages of gasoline (hydrocarbons distilling up to 150° C.) formed from cracking four oils under varying pressures at 500° C. Results for higher pressure low, owing to oil consumed in building up pressure.

cated as the yield increased progressively with pressure. The contrary indications for the pressure of 24 atmospheres are to be explained on the basis of the greater volume losses due to the building up of high pressures.