

ON THE DECOMPOSITION OF BENZENE AT HIGH TEMPERATURES.

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In the manufacture of both coal gas and carburetted water-gas it is a matter of great practical importance that we should have a knowledge of the temperatures at which the various hydrocarbons decompose (especially those used for enriching purposes), and the extent to which the decomposition increases with increasing temperature. The most important among these reactions is the decomposition of benzene (C_6H_6). Suppose, for instance, we start with the gas oils which are higher normal paraffins, the pyrogenetic reactions are such as are indicated by the following:—Higher paraffins $\rightarrow$ lower paraffins $\rightarrow$ olefines $\rightarrow$ acetylenes $\rightarrow$ benzenes $\rightarrow$ diphenyl, &c. $\rightarrow$ naphthalene, &c. $\rightarrow$ tarry matter $\rightarrow$ carbon and hydrogen. The great value of benzene in increasing the illuminating value of gas is well known; and the nuisance that arises from the formation of solid substances like diphenyl and naphthalene, which stop up both pipes and machinery, is one of the greatest obstacles in the manufacture of coal gas.

The precise nature of the above reactions becomes then of practical importance, and the experiments carried out were undertaken to throw some light, if possible, on the transition temperatures of these substances. The apparatus used is shown in Fig. 1.

To heat the furnace F, the rheostat R and the furnace F were joined in parallel and connected with the street circuit. The switch S was also inserted to permit of complete control of the current from the working table. The furnace was heated by means of hot platinum resistance wires embedded in its fire-brick walls. It was found con-



FIG. 1.