A STUDENT EXPERIMENT IN THE MEASUREMENT OF VAPOR PRESSURE

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The purpose of this experiment was to determine the changes in the vapor pressure of benzene with changes in

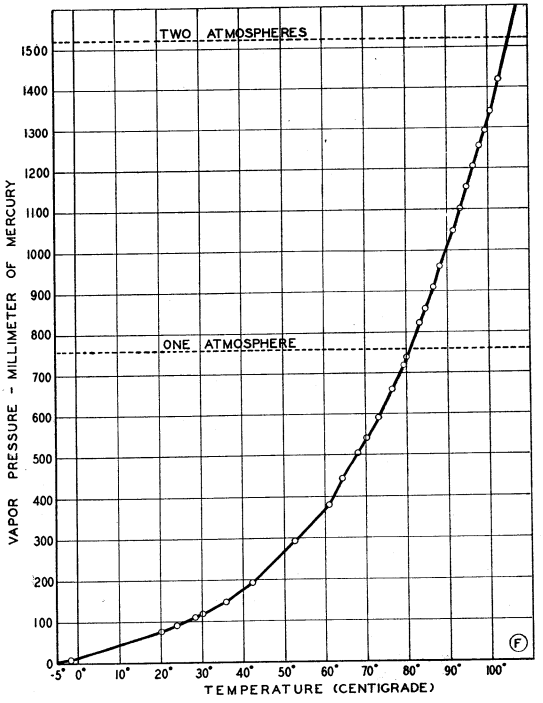

Fig. 1. Vapor pressure curve for benzene.

temperature; and from these data to derive a vapor pressure-temperature curve. Since a liquid will boil at any tem-

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perature at which its vapor pressure is equal to the pressure of the gas above it, the experiment consisted of finding the boiling point of benzene under various pressures.

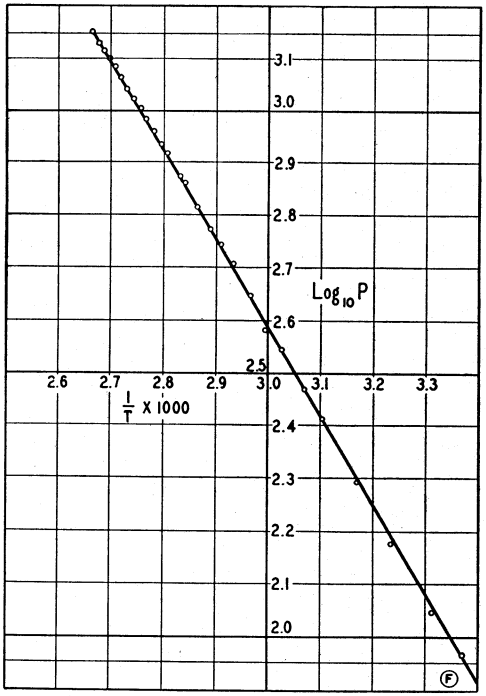

Fig. 2. Logarithm of vapor pressure of benzene plotted against reciprocal of absolute temperature. Points are located from data determined by the writer.

The low pressures were obtained by means of a filter pump connected to the water tap; and for the pressures higher than that of the atmosphere an automobile tire pump was used. In order to stabilize the vapor pressures, decreased or increased pressure was applied to the flask containing the benzene through an empty five-gallon bottle. The pressure was read by a manometer. A condenser was used in order to prevent loss of benzene vapor.

The results are shown by the graphs. Figure 1, showing vapor pressure plotted against temperature, reveals the principal data. Figure 2, showing the logarithm of vapor pressure plotted against the reciprocal of absolute temperature is used for checking the theoretical equation $L=RM$, where R is the gas constant and M the slope of the curve shown. The implication of this equation, that M is a constant, is borne out by the graph, and the actual value of L checks closely with the value found by solving this equation for L. One of the assumptions involved in the derivation of the equation, that L is a constant, holds true. M in this equation is the slope of the curve that would be obtained if the logarithms were converted to natural logarithms rather than to logarithms to the base 10 as shown.