25. Vapour Pressures of Diethyl Selenide, Tetramethyl Tin and Tetramethyl Lead.

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(Comm. by K. TAWARA, M.I.A., Feb. 12, 1929.)

The vapour pressures of diethyl selenide, tetramethyl tin and tetramethyl lead were measured by the statical method. The results obtained are shown in Table I.

Table I. Vapour pressures of diethyl selenide, tetramethyl tin and tetramethyl lead (mm of mercury column).

Temperature (°C)	Diethyl selenide	Tetramethyl tin	Tetramethyl lead
25.0	28	112	31
35.0	—	168	51

Now, the vapour pressure p at the absolute temperature T of a substance, which has the boiling point of T_B (absolute temperature) and the molecular heat of vaporisation of L , is expressed by the equation

$$\log_{10} p = \log_{10} 760 - \frac{L}{2.303R} \left(\frac{1}{T} - \frac{1}{T_B} \right) \dots\dots\dots (1)$$

Substituting the values for the vapour pressures at 25°C shown in Table I into the equation (1), the authors obtained the values for L/T_B and L/R of three substances above mentioned, as shown in Table II.

Table II. L/R and L/T_B of diethyl selenide, tetramethyl tin and tetramethyl lead.

	Diethyl selenide	Tetramethyl tin	Tetramethyl lead
T_B	383	350.5	383
L/R	4.43×10^3	3.811×10^3	4.30×10^3
L/T_B	22.9	21.6	22.3
$9.5 \log_{10} T_B - 0.007 T_B$	21.9	21.7	21.9

It is very interesting to see that the values for L/T_B coincide closely with those calculated on the basis of the revised rule of Trouton, showing that diethyl selenide, tetramethyl tin and tetramethyl lead are all the normal liquids.

Substituting the values for L/R shown in the Table II into the equation (1), the authors obtained the following equations, which give the vapour pressures p (mm of mercury column) of three substances above mentioned at any reasonable temperature T .

$$\log_{10} p = 7.905 - \frac{1924}{T} \quad (\text{For diethyl selenide})$$

$$\log_{10} p = 7.602 - \frac{1655}{T} \quad (\text{For tetramethyl tin})$$

$$\log_{10} p = 7.751 - \frac{1865}{T} \quad (\text{For tetramethyl lead})$$

Calculating the vapour pressures at 35.0°C of tetramethyl tin and tetramethyl lead on the basis of the above formula, the authors obtained the values of 169 mm and 50 mm, respectively, which are concordant with the value obtained by the experiment.