On an acoustic method of determining vapour-densities

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and we find, for the mean intensity I ,

$$I = \frac{2A}{\pi} = \frac{\frac{2E}{\pi}}{\left(R^2 + \frac{4\pi^2 U^2}{T^2}\right)^{\frac{1}{2}}}. \quad (4)$$

The electrometer, in the conditions in which I use it, does not give this mean intensity, but the square root of the mean of the squares of the intensities—that is to say, an intensity I' satisfying the condition

$$I'^2 \frac{T}{2} = A^2 \int_{t=\phi T}^{t=\phi T + \frac{T}{2}} \sin^2(mt - 2\pi\phi) dt = \frac{A^2 T}{4}.$$

From this we deduce

$$I' = \frac{A}{\sqrt{2}},$$

and consequently

$$\frac{I'}{I} = \frac{\pi}{2\sqrt{2}} = 1.11.$$

The formula to be compared with the experiments is therefore

$$I' = \frac{\frac{E_0}{\sqrt{2}}}{\left(R^2 + \frac{4\pi^2 U^2}{T^2}\right)^{\frac{1}{2}}},$$

—that is to say, the formula to which I had been empirically conducted.—*Comptes Rendus de l'Académie des Sciences*, Sept. 6, 1880, t. xci. pp. 468–470.

ON AN ACOUSTIC METHOD OF DETERMINING VAPOUR-DENSITIES.

BY H. GOLDSCHMIDT*.

From Laplace's formula for the velocity of sound in gases there results for the ratio of the densities of two gases d and D which, successively set in vibration in the same tube, give tones of the vibration-periods n and N ,

$$d : D = N^2 : n^2.$$

For $D=1$ (air),

$$d = N^2 : n^2 = \text{air-tone}^2 : \text{gas-tone}^2.$$

The author raps the test-tube filled with the gas in question, and seeks the resulting tone upon a violin. This procedure is applicable also to substances which are liquid at ordinary temperature. The test-tube, containing a small quantity of the substance, is closed above with a caoutchouc stopper through which passes a capillary tube, and brought to evaporation in steam. When no more vapour issues from the capillary tube, the stopper is pulled out and the tone then heard is determined. The observed agree very well with the calculated values.—*Wiedemann's Beiblätter*, 1880, No. 7, p. 500.

* *Chem. Ber.* xiii. pp. 768–771 (1880).