Nature (*London*) **135** 761 (1935)

Nature of the thermal agitation in liquids

The accompanying photographs (figure 1) represent the analysis by a Fabry–Perot étalon of the structure of the 4046 A, 4078 A and 4358 A radiations of a low-density water-coolded mercury arc, after they are scattered through an angle of 180° by a column of carbon tetrachloride liquid. In each case, two different temperatures of the liquid column (30° C and 70° C) were employed, the exposures being as nearly as possible otherwise under identical conditions.

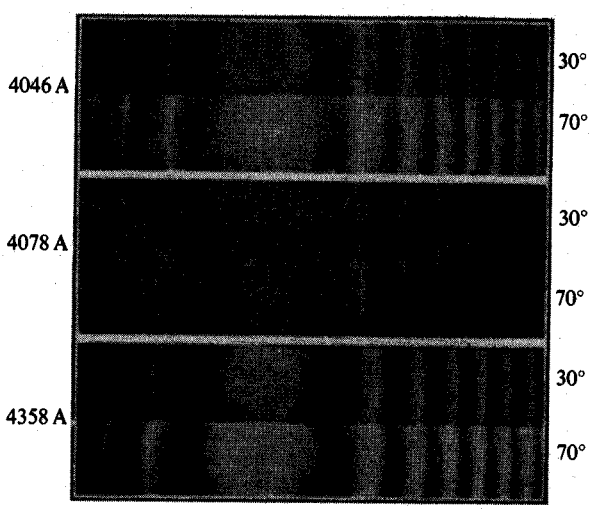

Figure 1

The choice of a Fabry–Perot étalon as the high resolving power instrument and of carbon tetrachloride as the scattering liquid were both determined by experience gained in this particular field of research[1]. It will be seen that a 40° rise of temperature produces a most remarkable change in the structure of the scattered radiation. The two Brillouin components having a Doppler shift

[1] B V Raghavendra Rao, *Proc. Indian Acad. Sci.*, 1934–35, 1, 261 and 473.

determined by the velocity of sound in the liquid, which are well-defined at the lower temperature, broaden greatly when the liquid is heated, and move in towards the central component, practically closing in upon it. The central component at the same time increases in intensity. The conception that ordered wave-trains of sound constitute the thermal energy in a liquid therefore departs more and more from the actual facts as the temperature of liquid is raised.

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24 March