

III. "Further Experiments on the Action of an Intermittent Beam of Radiant Heat on Gaseous Matter. Thermometric Measurements." By J. TYNDALL, F.R.S. Received February 21, 1881.

In the concluding paragraph of the note communicated on the 10th of January to the Royal Society these words occur:—"The vapours of all compound liquids will, I doubt not, be found sonorous in the intermittent beam." Since that time I have examined eighty different liquids, both at the ordinary temperature of the air and at their boiling temperatures, and have verified so far the prediction just quoted. In all cases I have obtained musical sounds—some feeble, some moderate, and some exceedingly strong. I have, moreover, determined by thermometric expansion the absorptions exerted by the vapours of more than twenty of these liquids, and it is my intention to subject the whole of them to this test. The harmony and mutual support exhibited by two series of experiments, conducted in accordance with these two diverse methods, are on the whole admirable. The investigation, however, is laborious, and many weeks must elapse before I am able to submit it *in extenso* to the Royal Society.

Tested by the thermometric method, my old experiments on aqueous vapour again affirm their validity. A long and narrow glass tube, bent into the form of a U, was partially filled with coloured water. One leg of the U was connected with the recipient which contained the gaseous substances submitted to experiment, while the other end was left open to the air. Before permitting the beam to pass, the liquid stood at the same level in both legs of the tube. Cleansing the recipient thoroughly, and filling it with well-dried air, a powerful beam was sent through it. There was no sensible expansion and consequently no perceptible motion of the thermometric column.

Air similarly dried was then passed over bibulous paper, moistened by water of a temperature of 14° C. The modicum of vapour carried forward at this temperature by the dried air, when smitten by the beam, produced instantly a depression of 55 millims. in the leg of the tube connected with the recipient, and an equal elevation in the other leg. The difference of level in the two legs amounted, therefore, to 110 millims. No trace of haze or sign of condensation could be detected within the recipient. Its boundaries were as bright, and its contents as free from turbidity, as when the dry air alone was employed.

With a conical tube of a certain size, stopped at its base by a transparent plate of rocksalt, I have obtained a considerable intensification of the sounds. Abandoning the ear-tube altogether, and filling the

hollow cone with olefiant gas, its music has been heard at a distance of 18 feet from the source of sound.

*Presents, February 3, 1881.*

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