



IX. On the connexion of electricity with evaporation

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To cite this article: Mr. G.A. Rowell (1842) IX. On the connexion of electricity with evaporation , Philosophical Magazine Series 3, 20:128, 45-46, DOI: [10.1080/14786444208650511](https://doi.org/10.1080/14786444208650511)

To link to this article: <http://dx.doi.org/10.1080/14786444208650511>



Published online: 01 Jun 2009.



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needle which is *unmagnetized* in the common acceptation of the word.

20. It may be necessary to add, that the prism with which I operated was one of crown glass about four inches in length, and that it was held with both hands at the distance of about half an inch from the surface of the water, in such a position that the red rays of the spectrum were nearest the observer.

R. V.

IX. *On the Connexion of Electricity with Evaporation.* By
MR. G. A. ROWELL.

To the Editors of the Philosophical Magazine and Journal.

GENTLEMEN,

IN a paper read before the British Association at Glasgow, I endeavoured to explain the various phænomena of rain, the aurora, and magnetism, by the hypothesis, that each particle of vapour takes with it from the earth its proportion of electricity, according to its expanded surface; that if condensed within the electrical attraction of the earth, the surcharge of electricity is withdrawn and the vapour is deposited as dew; but if it rise out of the electrical attraction of the earth, and is then condensed, the electricity, being insulated, forms an atmosphere around each particle of vapour; which surcharge of electricity not only suspends the vapour by its lightness, but also repels the neighbouring particles of vapour, and prevents the formation of rain; and on the removal (by any cause) of the electricity inclosing the vaporous particles, the repulsion is removed, and the particles of vapour then attract each other and form rain.

The discovery of the electricity of steam has strengthened my opinion, and the following experiment was made to prove that evaporation would not go on so freely from an insulated vessel as from an uninsulated one: believing the experiment is new, I respectfully submit it to the attention of the readers of your valuable Journal.

In a warm room over an oven in daily use, I suspended by silk threads two shallow vessels, eight inches and a half in diameter, containing eight ounces of water each; a small copper wire was hung from one vessel to the earth to take off the insulation, both vessels being similarly suspended in every other respect; after being suspended twenty-five hours the insulated vessel had lost two ounces eleven dwts. and fifteen grains; and the other vessel three ounces six dwts., showing an excess of evaporation from the non-insulated one of fourteen dwts. nine grains.

I have tried similar experiments with water placed in the rays of the sun, and on all occasions the evaporation has been greatest from the non-insulated vessel. There is a difficulty in obtaining correct calculations from the above experiments, as it is scarcely possible to keep up complete insulation from electricity; and the vessel of water must have its proportion of electricity when placed in an insulating situation, which will assist the evaporation for some time; but I believe if complete insulation could be obtained, and a vessel left without any electricity, that no evaporation would go on at moderate temperatures, and that evaporation at low temperature is owing to the extreme lightness, or rather no weight of electricity, buoying up the particles of water when expanded by heat.

I am, Gentlemen, yours, &c.

Oxford, Oct. 8, 1841.

G. A. ROWELL.

X. *Remarks on Sir J. W. Lubbock's "Theory of Heat and Vapours."* By JAMES IVORY, K.H., M.A., Hon. M.R.I.A., *Instit. Reg. Sc. Paris, et Reg. Sc. Götting. Corresp., and late a Fellow of the Royal Society of London*.*

THE Theory of Heat and Vapours, published some time ago by Sir J. W. Lubbock, and reprinted in this Journal, [S. 3. vols. xvi. xvii.], requires some observations from me. It is not intended to examine minutely the whole tract, but only to make some brief remarks on the two last sections which treat of the atmosphere and the atmospheric refractions. The temperature, the density, and the pressure of a mass of air being represented by θ , ρ , p , the author assumes this equation,

$$V = C + D(1 + \alpha \theta),$$

in which V stands for the absolute heat, that is, for the sum of the sensible and latent heats, and C and D are constants. The author next adopts another equation, first given by Laplace, viz.

$$V = A + \beta \frac{p^{\frac{1}{\gamma}}}{\rho},$$

A , β and γ being constants. By equating the two values of V , we obtain

$$C + D(1 + \alpha \theta) = A + \beta \frac{p^{\frac{1}{\gamma}}}{\rho},$$

which is the fundamental equation of the Theory of Heat

* Communicated by the Author.