Trinity College
Cambridge
Feb 11th 1887

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Dear Professor Fitzgerald,

I must apologise for my delay in answering your letter but I have been exceedingly busy this term as Glazebrook has been laid up with scarlet fever and I have had his work and my own to do & to make matters worse I was suffering from an attack of sleeplessness, a very unusual thing for me who usually sleeps too much, & found it as much as I could do to get through the work at the Laboratory. In answer to your first point I have always supposed that the dips against the rating were washed

off the rating by the action of the other rings ~~from~~ what form the molecules of the gas in the volume of which the rating forms the boundary, in this view the pressure is borne by the ether in the vessel. With regard to your second point no doubt for a single ring the energy would diminish as the temperature increased which as you say is inadmissible - but the case is not so when we have a complicated ring with many coils. for we can increase the velocity of such a ring by supposing the coils to approach each other ~~in this case the velo~~ without altering its radius, in this case the energy increases as well as the velocity. In fact in the case of a very complicated molecule I show in my paper that the number of molecules which have the energy in the neighbouring fluid between $\alpha + \alpha + \delta\alpha$. & the energy of translation of ~~the~~ molecule itself between $\beta + \beta + \delta\beta$ is

$$C' \varepsilon^{-h(\alpha+\beta)} \alpha^{\frac{3p-2}{2}} \beta^{\frac{3p-16}{4}} d\alpha\, d\beta$$

so that if the molecule is so complex that $\alpha + \beta$ are independent the mean value of α will be a constant multiple of the mean value of β. In this case the whole energy in the system is proportional to the kinetic energy of translation of the vortex cores.

I am
Yours very truly
J. J. Thomson

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