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Letter from M.I. Pupin to R.B. LeCocq, February 8, 1928

Michael I. Pupin

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MICHAEL I. PUPIN
ONE WEST SEVENTY-SECOND STREET
NEW YORK CITY

February 8, 1928.

Ralph B. Le Cocq, Esq.,
Linden, Wash.

My dear Sir:

I thank you very much for the kind words of your letter.

The heat energy of a body as measured by temperature is due to the chaotic molecular motion. It is the molecules which impart their momenta to the piston and also to the walls of the containing cylinder. The walls do not move, because they are fixed in position. The piston is permitted to move and by this motion sets machinery in motion which is coupled to it. It is not the electrons, but the molecules which do this work.

In every assemblage of a very large number of units in which each unit has an approximately an autonomous existence the activity must necessarily be a chaotic one. Imagine one of the molecules in a gas receiving an impulse. It will start its motion in the direction of that impulse until it collides with another molecule and communicate to it a part of its motion. It will take me too long to go into all the details in order to show that the resulting motion of the molecules will be a chaotic one. You can work that out yourself.

You ask why the electrons jump out of the stable orbits? They do it, because the atoms to which the electrons belongs collide with other atoms. When you take a walk from one point to another point you try to do it by following a definite direction. But suddenly somebody bumps into you; that will deflect you from the direction which you followed. *What will happen if at each step you make somebody bumps into you?*

I hope that these rough explanations will be helpful.

Yours sincerely,

M. I. Pupin.