TOWARDS A GENERAL THEORY OF PHYSICS II

1. In electromagnetic radiation one can see a kind of *horizon* of the whole range of phenomena studied in Physics. This should help us to think about the *three ideas* that gave rise to the theories that history has bequeathed us. These theories may be classified in accordance with the following: *path*, *wave* and *heat* are directing images of all reflection, conditioning, from the outset, its course and difficulty. I therefore propose to explore the following analogy: the *paths* studied in Mechanics are for *Geometrical Optics* as *material waves* are for *Undulatory optics* and *heat* is for what I term *Thermal Optics*.

2. Thus, I postulate an equivalence between three different types of *clock*: *rulers*, pulses and *thermometers* should be able to be standardised in an integrated manner. *Time* is understood here as a function of the so-called "velocity" of the process under study (the *distance* travelled, the *number of pulsations* occurred, or the *temperature/volume* difference), whereby the three types of the theory mentioned above should be characterised as follows:

Path:	Mass	Velocity ($V_1 = d/t$)	Energy
Wave:	Amplitude	Velocity ($V_2 = \lambda \cdot \nu$)	Energy
Heat:	Pressure	Velocity ($V_3 = T/vol.$)	Energy

3. *Mass*, *pressure* and *amplitude* should be understood as the expression of an *equivalence* between the *three theoretical models*. They reflect the way in which *velocity* and *energy* are related in each case, by means of a *system of constants*. Just as, in the case of *paths* – where *energy* is understood as the product of the *mass* of the body in motion and the square of its *velocity* – we obtained, for the limit of the velocity ($V_1 = c$), something that may be understood as a *limit of mass/curvature*, we should also explore the meaning of the limits of "velocity" proposed for the other two models, with respect to their *amplitude* and *pressure*.

4. Thus, if $E \rightarrow mc^2$ and $E/d \rightarrow L_1 = c^4/G$, where $c = d/t$ for the distance travelled by light in a vacuum, we have:

   For the wave: $E = f_2$ (amplitude) $\rightarrow L_2 = f_2^*$ (c, h), where $c = \lambda \cdot n \sec^{-1}$ for the number of pulsations of electromagnetic radiation

   For heat: $E = f_3$ (pressure) $\rightarrow L_3 = f_3^*$ (c_0, k), where $c_0 = T/vol.$ for the *photonic thermometer*.

   I propose, therefore, that the limits of "velocity" suggested here should be understood as leading to *two other constants* (*amplitude and pressure*) which should, by analogy with paths, have the dimensions of a *surface or volumetric energy density* (E/d^2, E/d^3), and should appear as *functions* of the "limit of velocity" of the process in question (c, c_0) and another fundamental constant (h, k).

5. This being so, perhaps one can understand *mass*, *action* and *entropy* as three expressions – mechanical, undulatory, and thermal – of the same fundamental resistance to change, the same *inertia*. That is: the *mass/curvature* relationship should have an equivalence in the other two models – *action/amplitude* and *entropy/pressure*. This equivalence may be shown by studying the consequences of the *limits of velocity* corresponding to the respective processes, as proposed above. Just as $E = mc^2$ where $v \rightarrow c$, we have $E = h \cdot \nu_L$ where $\nu \rightarrow \nu_L$ and $E = k \cdot T_L$ where $T \rightarrow T_L$.