[illegible]IVITY [illegible]

H.T. [illegible]

A. Optimum [illegible] Principle Applied to [illegible]

In [illegible] the principle has been stated that open steady state systems tend to be adjusted at an optimum but low [illegible] that corresponds to the maximum power [illegible] ([illegible] and Pinkerton, American Scient[illegible], in press) That this princi[illegible] is [illegible] systems seems indicated in Figure 15 below:

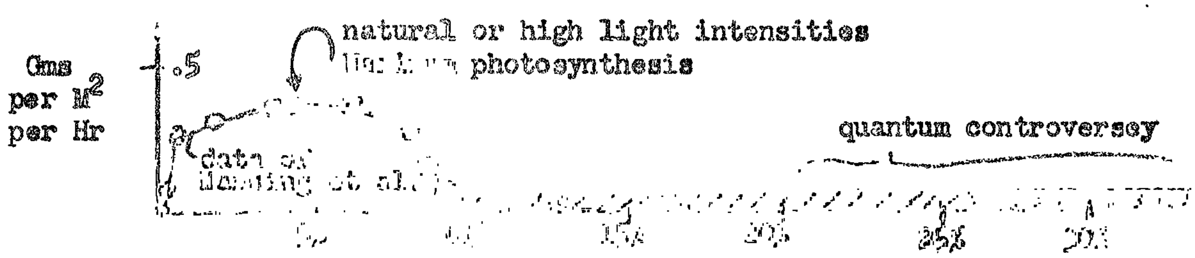

Figure 15. [illegible] versus [illegible] indicating low but [illegible] associated with maximum output

This graph shows that [illegible] such as have been achieved in all the work associated [illegible] the quantum controversey have all been [illegible] light intensities so that the [illegible] output of glucose has been [illegible]. On the other hand the [illegible] populations of algae [illegible] to [illegible] natural light intensities run at [illegible] and [illegible] light intensities but so that a much greater [illegible] of [illegible] results. If plant[illegible] are evolutionarily adapted to maximum output [illegible] must sacrifice efficiency for power by this hypothesis. This is a [illegible] of [illegible] that attempts to increase world food by raising chlorella at [illegible] must necessarily flop. A second part of this [illegible] may be stated that the optimum efficiency for maximum power output [illegible] decreases as the light intensity increases. Plants adapted in nature to deep water achieve the optimum adjustement at a higher effici[illegible] that at the surface. [illegible], a plant adjusted for one light intensity can not be moved imm[illegible] to another light intensity and achieve the [illegible] without internal modification. A car climbing a hill in [illegible] at optimum [illegible] cannot achieve the optimum efficiency for a [illegible] away without [illegible]. In the plant gears may be the concentration gradients. The efficiencies in Figure 15 are of the same [illegible] at optimum adjustement as those found in Silver Springs and the Coral [illegible].

B. Organismal Size versus [illegible] in Phototrophs in Optimum Adjustment

It is now well know that metabolism of heterotrophic organisms is inverse to body size roughly in a 2/3 [illegible] function that is presumed to be related to the surface/volume [illegible] to [illegible] processes. [illegible] the above section it was concluded that [illegible] in open steady state tend to all become adjusted to a similar state of running at maximum power output because of the survival [illegible] in [illegible] both in an environmental and evolutionary sense. With [illegible] intensities, similar steady state plant [illegible] be [illegible] to similar efficiencies and thus similar total [illegible] power output of [illegible] on an <u>AREA</u> basis.