ENERGY FLOW IN AN ECOSYSTEM

The energy used in all life processes is derived from solar radiation. It is fixed by the green plants during photosynthesis by converting the light energy to chemical energy and making it available to other organisms as food. The energy fixed is lost at several steps as heat which cannot be recycled. Thus the continuous flow of energy from through organisms to outer space maintains the life on the earth. To understand the steps involved in the flow of energy through the organisms, it is necessary to understand the laws of thermodynamics that govern the transfer and transformation of energy.

First law of thermodynamics: A/c to first law of thermodynamics the energy cannot be destroyed but only transformed to different forms. It is represented by the equation:-

$\Delta E = q - w$ (ΔE: change in energy of body.
q: heat or other energy absorbed by the body.
w: work done by body on its environment).

Second law of thermodynamics:- A/c to this law during the transformation from one form to the other the energy is degraded into a non-available form. In other words no energy transformations can be 100 percent efficient. This law is represented as:-

$[\Delta E = \Delta A + \Delta TS]$ where,

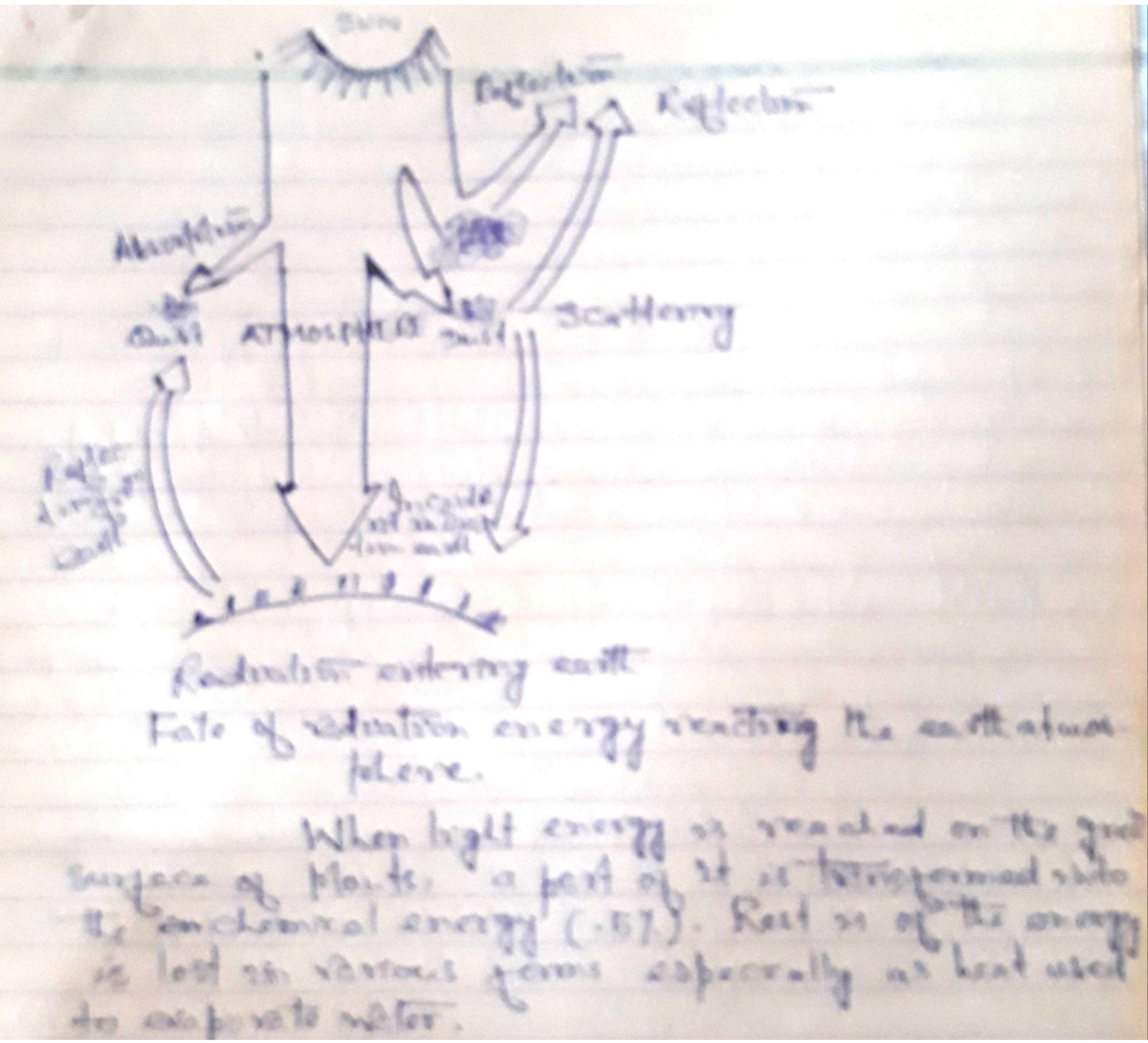
ΔA : Isothermally available energy.
ΔTS : Isothermally unavailable energy.
T : Absolute temp.
S : Entropy.

Quantity A is frequently known as Gibb's free energy. Only this portion of the increase in energy is available to the work within the plant.

Energy flow involves three imp aspects stated

1. Quantity of energy reaching an ecosystem per unit area / unit time.
2. Quantity of energy tapped by green plants and converted to chemical energy.
3. Quantity and path of energy flow from green plants to organism of different trophic levels over a period of time in a known area.

The radiant energy produced in the Sun travels through the space in terms of waves. While most of the radiations are lost in space those of the wavelengths from 300 μ to 10 μ and above 1 cm enter the earths outer atmosphere. Even as the radiations pass through the atmosphere. Some of them the ultraviolet are absorbed by the Ozone layer in the outer atmosphere. The energy reaching the earths surface consists largely of the light (390-760 m μ) and the heat radiation (infra red). The dust and water vapours in the atmosphere cause great changes in the amount of energy reaching the earth as Some of it is absorbed or reflected back to the space.



Radiation entering earth

Fate of radiation energy reaching the earth's surface.

When light energy is received on the ground surface of Plants, a part of it is transformed into the chemical energy (.5%). Rest of the energy is lost as various forms especially as heat which