

HARNESSING SUNS'S RAYS FOR ENERGY.

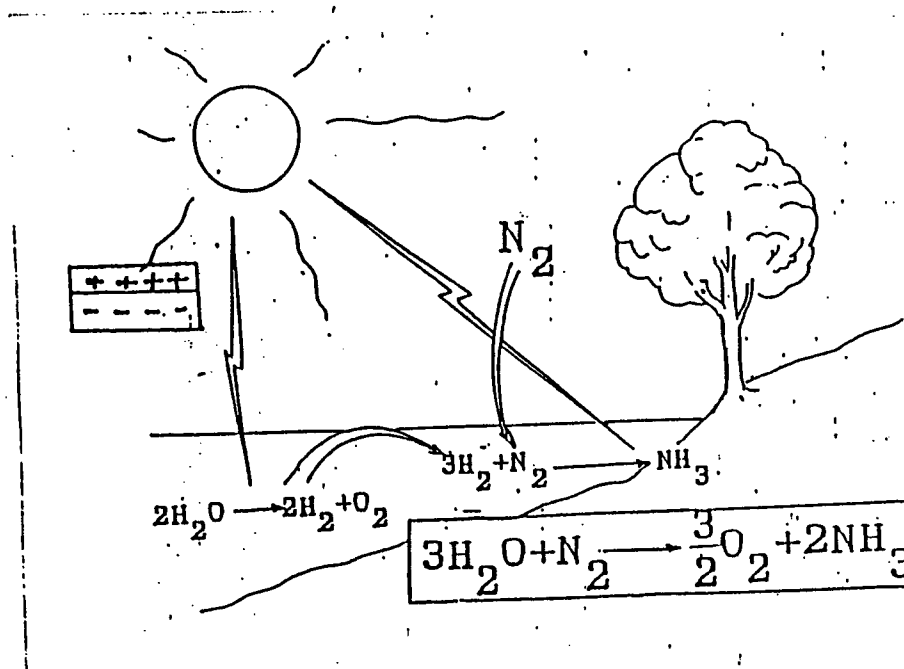
By

Professor Kirthi Tennakone

(Programme Leader)

Venue : IFS Conference Hall,
Hantana Road, Kandy

28 February 1987



Programme Director : Professor Cyril Ponnampereuma.
Programme Co-ordinator : Professor Kapila Dahanayake
Programme Editor : Daya de Silva

TODAY'S PROGRAMME

- 9.00 - 10.00 a.m. Inauguration of the IFS School Science Programme
- 10.00 - 10.30 a.m. Harnessing Sun's Rays for Energy - Part I, by
Professor K Tennakone
- 10.30 - 11.30 a.m. Ceremonial Opening of the New Wing and
Coffee with Dr Arthur C Clarke
- 11.30 - 12.00 noon Harnessing Sun's Rays for Energy - Part II, by
Professor K Tennakone
- 12.00 - 1.00 p.m. Practical Solar Energy Conversion Devices, by
Mr P Sumanasekara (Managing Director, Vidya Silpa
and Ex-Meteorologist)
- "Measurements of Solar Intensity", "Experiments
with Light" Demonstration and Experiments, by
S Wickramanayake and Swarna Punchihewa
(Research Assistants, IFS)
- 1.00 - 2.00 p.m. L U N C H
- 2.00 - 2.30 p.m. Video Presentation
- 2.30 - 3.30 p.m. Discussion
- 3.30 - 4.30 p.m. Quiz
- 4.30 p.m. T E A

End of Day's Programme

HARNESSING SUN'S RAYS FOR ENERGY

by

Professor K. Tennakone

Energy is the ability to do work. It is also the entity that changes disorder into the order. Heat, light and motion are different manifestations of energy and they transform into each other. Ultimately all forms of energy dissipate into heat, the random motion of the molecules. The conversion of heat into work is limited by the Second Law of Thermodynamics, which says that the total amount of heat in an object cannot be converted into useful work with an efficiency of unity. Einstein showed that matter and energy are interconvertible and it was soon realized that the sun draws energy from transformation of matter. In this process sun burns up 580 tons of its mass every day radiating at a rate of 2×10^{30} J an year.

Solar energy of 6×10^{24} J falling on the earth during an year is 30,000 times more than the present global consumption of energy. Undoubtedly solar energy is plentiful, clean and non-polluting. However, it so diluted that harnessing becomes exceedingly difficult. A solar power generator of capacity equivalent to Victoria will have to cover an area of several square kilometers. The construction of such a facility using silicon solar cells would cost more than Rs.5000 billion. Current research in solar energy is geared towards development of cheaper solar cells and photochemical

systems capable of conversion and storage of solar energy. The most attractive would be the development of a device that could split water into hydrogen and oxygen using solar energy. When they recombine energy is liberated with regeneration of water. An equally important process is the photofixation of nitrogen to produce fertilizer. Photodecomposition of water and photofixation of nitrogen at a reasonably high efficiency will solve all 'problems of mankind' till foreseeable future. In the ultimate analysis all social evils originate from insufficiency in energy. If there is energy the disorder can be put into the order and all material needs can be made from cheap and inert matter.

A breakthrough in harnessing solar energy would come from the global collaboration in research. Apart from the practical necessity, investigations in this field present challenging fundamental problems. Difficult problems always attract scientists. The photochemistry and photophysics programme of the Institute of Fundamental Studies has entered into all aspects of basic solar energy research and work that is already carried out has received international recognition. The frontiers of science are not inaccessible to the college student. This programme is an attempt to expose the young minds to latest developments in the field of solar energy conversion.