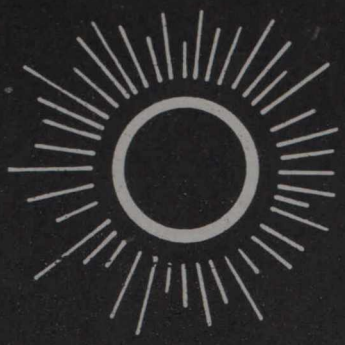

SOLAR ENERGY

SOME EXPERIMENTS IN CANADA

Private and government organisations in Canada have been working steadily to evolve the cheapest and most efficient methods of using Solar energy. Research and development in this field will benefit all mankind by providing an alternate energy source.

It has been calculated that the sun shines with a constant power of 380 million billion billion watts a second. Through two fusion reactions, it transforms an inconceivable 657 million tons of solar hydrogen into 652.5 million tons of helium ash every second. The remaining 4½ million tons of mass is converted into radiant energy. The sun, for all practical purposes, represents an infinite source of radiant energy.

Conversion of this vast mass of radiant energy into heat energy is possible. All you need is a device commonly called a solar collector. It could be a flat plate (or low temperature) collector, or a focusing (or high temperature) collector. Both convert radiant energy, in most cases, to sensible heat, characterized by a change in the temperature of the transport medium. The most common flat plate collectors use either air or water as the heat transport medium.

The focusing collector concentrates radiation from a large collector area and beams it to a small target zone, producing very high temperatures in the area. It holds promise of satisfying certain types of needs, ranging from domestic cooking to high temperature requirements of industry.

As far back as 1946, the Indian Government franchised two factories to make a solar cooker for use by India's 300 million peasants. The experiment aroused much interest even if one made allowance for the fact that the peasants generally preferred to take meals after daylight hours and the women were reluctant to stand in the sun to produce a meal where ambient air temperatures sometimes reach as high as 100°F.

It proved that if focusing collectors were coupled with a storage device which would supply energy on demand, they could prove an attractive method of obtaining high temperatures. Many different types of focusing collectors have since been invented.

The design of solar heat collectors, indispensable as they promise to be, involves research and development in many areas. A technology is emerging which is interested in the performance of glasses, plastics, metals and insulation, particularly for their ability to absorb radiant energy and exhibit low emissivity.

Because of the sporadic nature of solar radiation, it is necessary to complement a solar collector with a heat storage unit to hold surplus heat energy to be supplied on demand.

The storage of heat energy can be accomplished in two ways. First, storage of sensible heat. This involves materials that will exhibit a rise in temperature as the heat energy is accumulated within the storage unit. Some of the more common materials used are rock or stone, and water. The second method of heat storage is the use of heat of fusion of certain materials that accumulate heat energy in a change of state. The materials most commonly used for this purpose are usually waxes or salt hydrates, both of which are still relatively inexpensive.

To gauge the heat storage capacity of these two types of storage devices, consider first the sensible heat approach. If we had a well-insulated storage container and wanted to store 2 million units of heat energy using rock or stone, 1,000 cubic feet of aggregate raised to 1000F above ambient temperature