Mausam, (1982), 33 1, 131-136

Letters to the Editor

551.521.1

OPERATION OF THE RECORDER ATTACHED TO THE STAR PYRANOMETER DURING DAY-TIME ONLY

When solar radiation is continuously recorded with the help of a thermocoupled type pyranometer, such as the star pyranometer, a recorder is usually coupled to it to record the solar radiation intensity. Since it is not always practicable to operate manually the switch in the early morning before sunrise and in the evening after sunset, the recorder is usually left with the main-line switch on . This means that the recorder-chart is unnecessarily consumed even in the night-time when there is nothing to be recorded. It seems that this fact is not considered seriously so far. To run the recorder during day-time only, the use of a transisterized relay-switch which is activated by a photo-resistor and coupled to the recorded is discussed here.

2. A diagram of this set-up is shown in the Fig. 1. The relay-switch used here operates on 9 volts 100 ma supply line.

The working principle of the relay-switch is as follows: After sunset, when it gets dark, the resistance of the photo-resistor tends to be infinite, so that the current through its circuit be almost zero. Since the potential drop across AB in the Fig. 1 would also be zero, the transistors would not be operative. In the morning, when the sunlight acts on it as the sun rises, the resistance of the photo-resistor starts decreasing and thus flowing the current through the circuit. The potential drop across AB would now be available to activate the transistors. This, in turn, closes the relay-switch circuit. It may be so arranged that when the relay-switch is closed, the recorder starts functioning and when the relay-switch is off, the main line to the recorder is also cut-off.

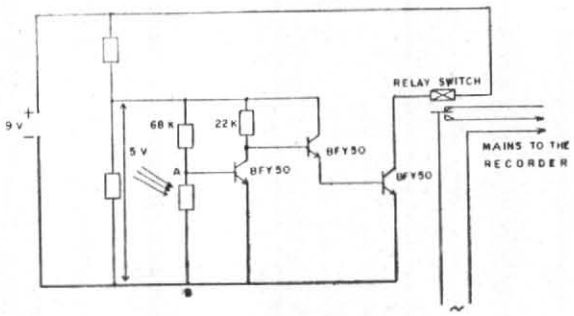

Fig. 1. Circuit diagram used to connect the main supply line to the recorder

In Figs. 2 & 3 two consecutive days' recordings of solar radiation are shown with the relay-switch attached and without it respectively. The recorder is found to automatically switch on or off about half an hour before sunrise or after sunset respectively. With this arrangement, even during summer almost 10 hours' valuable chart paper is saved every day from being used up unnecessarily. It is also found that no amount of cloud-coverage during day-time disconnects the recorder, as shown in the Fig. 4.

Using the above mentioned relay-switch attached to the recorder, the author has been able to run the recorder during day-time only, recording solar insolation for 1980 at the Physics Department, Kirtipur Campus, Kathmandu. The relay-switch is found to perform well as expected throughout the year.

3. One disadvantage of this arrangement, encountered so far, is that during winter mornings, when there occurs dense fog, the relay-switch is found to be on only when most of the fog dissipates. It would mean that on the hills where dense fog may appear often even during day-time, the recorder may be interrupted often, thus making the exact timing of the events difficult.

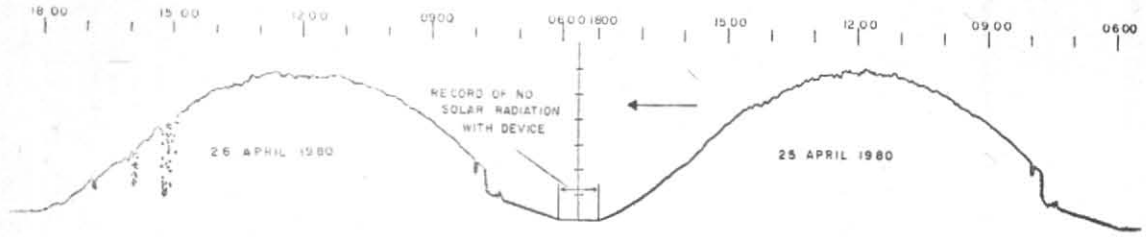

Fig. 2. Recording of solar insolation for two consecutive days 25 and 26 April 1980 with the star pyranometer using the device

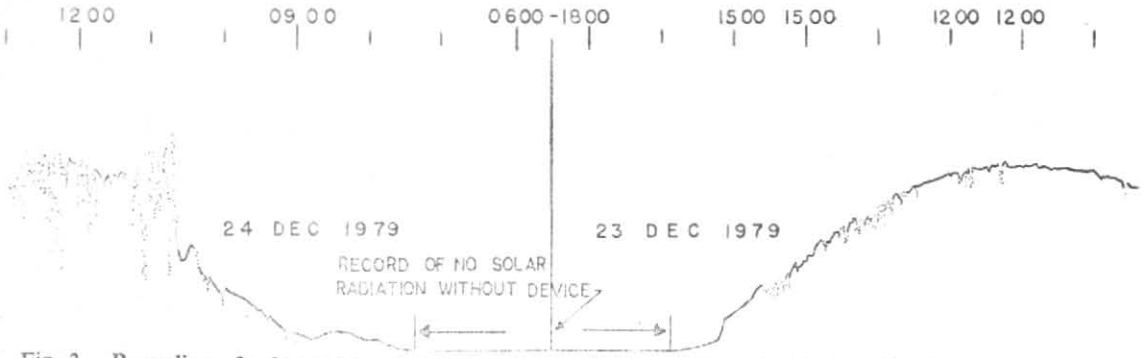

Fig. 3. Recording of solar insolation for two consecutive days 23 and 24 December 1979 with the star pyranometer without using the device

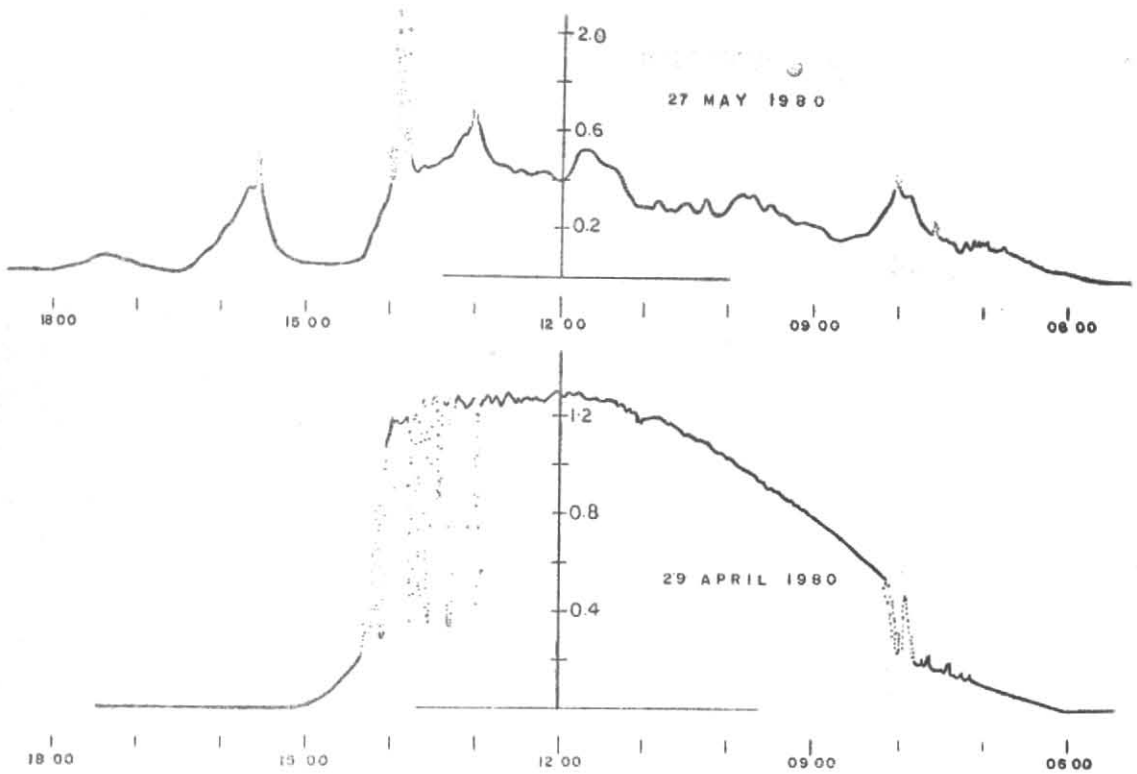

Fig. 4. Two recordings of solar insolation to show that the switching of the supply-line to the recorder, when the device is used, is not effected by the heavy cloud amount during day-time :
Lower : Recording of 29 April 1980 when the radiation dropped to near zero due to heavy cloud coverage after 14.30 hours
Upper : Recording of 27 May 1980 — an overcast day, when the radiation dropped to near zero at two occasions (around 15.00 and 16.30 hours)

4. The author wishes to convey gratitudes to his colleagues Sarvashri J. M. Pradhan and D. M. Amatya for the help extended and encouragement in preparing this paper.

Tribhuvan University, Kathmandu, Nepal
25 April 1981

VISHNU M. SHRESTHA