THE IMPROVED SUN BASKET

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In recent years and months prices for fuel and light have rapidly increased in India[1], so that housewives and others interested in saving fuel have shown renewed interest in alternative sources of energy for household use. This is especially true for regions of India where, on the one hand, low rainfall and limited vegetative growth restrict the availability of firewood so that prices are high[2], but, on the other hand, sunshine is relatively abundant so that solar powered devices such as box cookers or sun baskets do hold a potential.

The Sun Basket was proposed for cooking with solar energy several years ago[3]. This was a low cost papier machee made parabolic mirror in a bamboo frame equipped with a simple automatic tracking device, synchronizing the adjustment of the parabolic mirror with the sun's movement during the day. This tracking device operates on a simple principle: a weight floating on a gradually descending water level pulls a string, which turns the basket. However, because of a number of drawbacks at that time the original low cost Sun Basket found only limited acceptance.

An improved version of the Sun Basket has now been developed in collaboration with two industrial companies in Hyderabad which are ready to market it in large numbers. The new model consists of a metal frame for holding and adjusting the Sun Basket according to seasonal and daily changes in the sun's position. The shell of the parabolic mirror is made of fiberglass, and a reflector of metalized polyester is glued into the shell. The water pipe that serves as a timing device for the automatic adjustment during the day is integrated into the stand. Therefore the entire unit is compact as well as easy to move and operate.

The improved model overcomes many of the drawbacks observed with the earlier version of papier machee and bamboo, which had to be protected from rain and did not always move accurately. In the earlier model the water pipe for the tracking device was located away from the Sun Basket, and the whole set required a

relatively large area, which is not often available in courtyards or gardens, or on roofs or balconies.

The efficiency of the improved model is, as in the older version, about 50%, i.e. the parabolic mirror of about 1.2 m in diameter with an intake of about 1 kw would deliver about 500 watts to the cooking pot. This makes it possible to cook all meals which require wet cooking, steaming, baking or roasting, but not frying, in a location such as Hyderabad (17^0 latitude) in about the same length of time and of the same quality as those cooked on a traditional kerosene stove; for deep frying the sun basket does not reach sufficiently high temperatures[4].

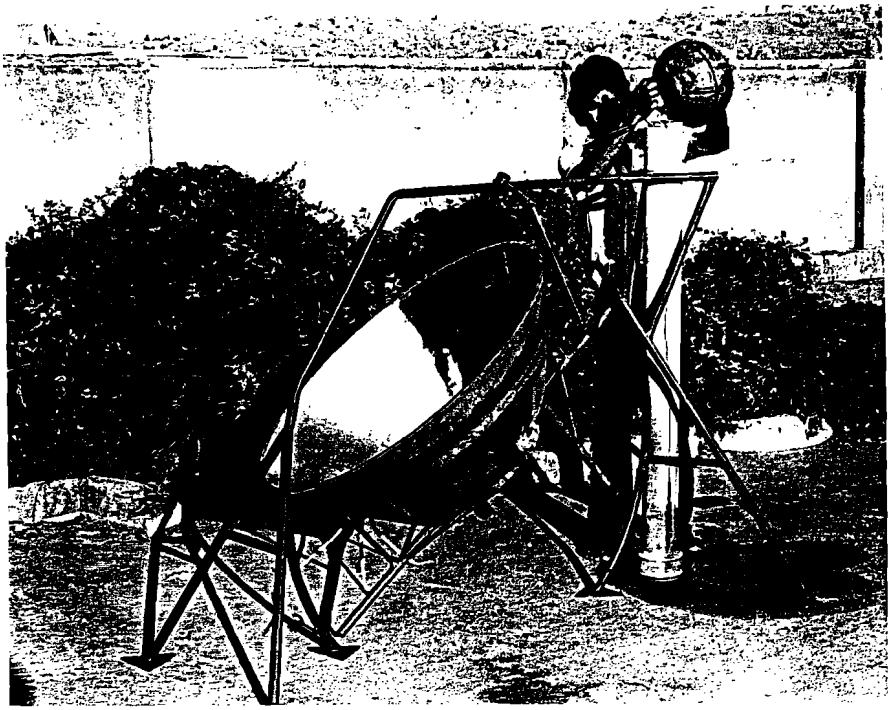
The following pictures depict the improved Sun Basket and explain its use. To some critical observers it may seem deplorable that this device, here shown typically inside a compound belonging to a suburban high income family, is likely to benefit first those who probably need it least, while low income communities can hardly afford to pay for it at this stage. However, it should be pointed out that those high income families risking an early adoption are making a significant contribution to the introduction of a new technology by testing its applicability in the early stages. After the device has become popular enough to be produced in larger numbers and at lower costs, it will become readily available to poorer groups.

The cost of producing this new, durable, compact and easy-to-operate model of the Sun Basket is relatively reasonable--its sale price in Hyderabad in 1981 is around Rs. 600/-[5]. With a lifespan of at least six years and an occasional relining of the reflector surface being the only major maintenance required, annual costs will average around Rs. 200/-. At prices for liquefied petroleum gas of around Rs. 50/cylinder--for those who have access to this form of energy--[6] households using the Sun Basket and thereby saving at least four cylinders of gas would about break even with the costs. All households that normally consume about nine gas cylinders per year or more and that utilize the Sun Basket often enough to save 50% of this gas would save by using the Sun Basket in Hyderabad. As fuel prices continue to rise in future years relative to general prices, a Sun Basket will be an even greater economy.

OPERATION OF THE SUN BASKET

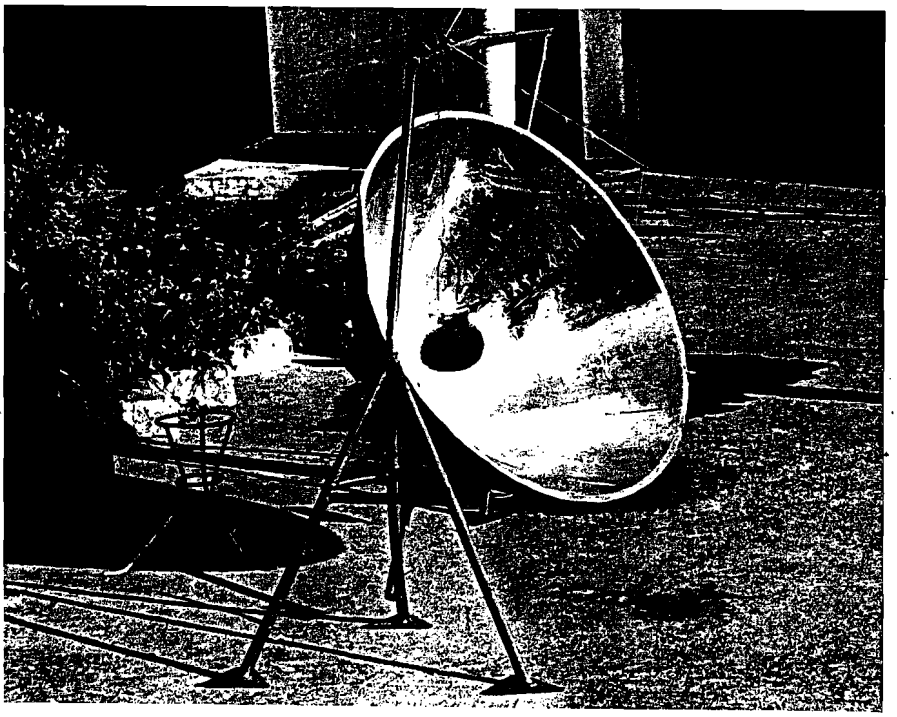
Starting the tracking device...

As the cement pipe is being filled with water a weight inside floats up and...

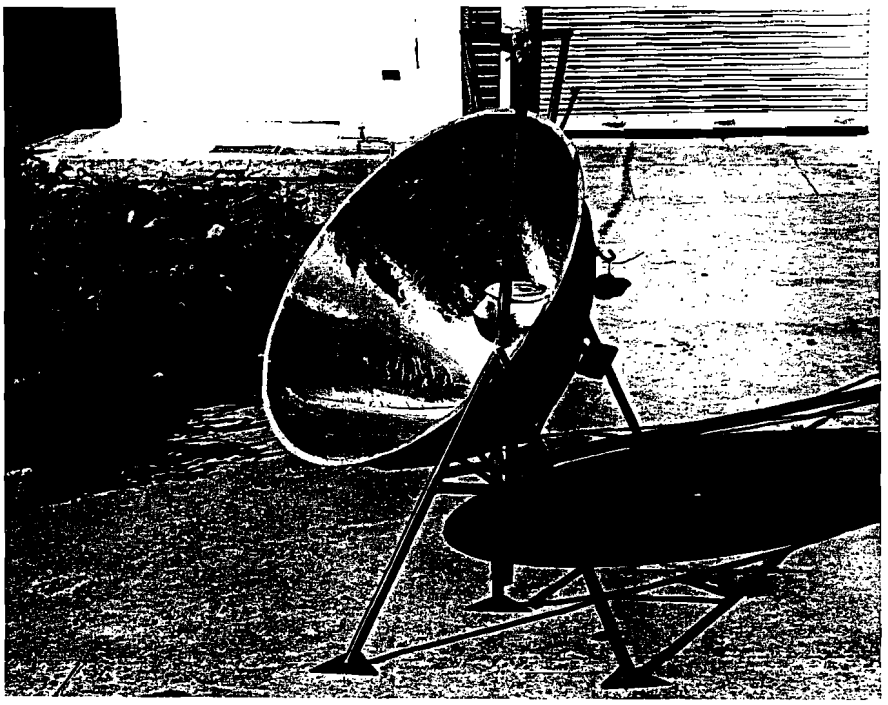


the Sun Basket tilts to the east to face the morning sun.

The cooking pot remains in focus...



The cooking pot hangs in the focal point. While water trickles through outlet at the bottom of the cement pipe...



The Sun Basket turns slowly, always directed towards the sun; the cooking pot receiving focal heat throughout.

NOTES

[1] See Figure 1

[2] See Figure 2

[3] Von Oppen, M. 1977. The sun basket. Appropriate Technology 4 (3): 7-10; and 1978. An automatic device for the sun basket. Appropriate Technology 5(2): 7-8.

[4] This was confirmed by a study testing various solar cookers with about 12 recipes which was carried out at the Department of Home Science, College of Agriculture, Andhra Pradesh Agriculture University, Hyderabad in 1980.

[5] Approximate exchange rate U.S. $1 = 8 Rs.

[6] Those who apply for a connection for the first time may be put on a waiting list for several years and after getting the connection they have to deposit Rs. 200/- with the gas supplier.

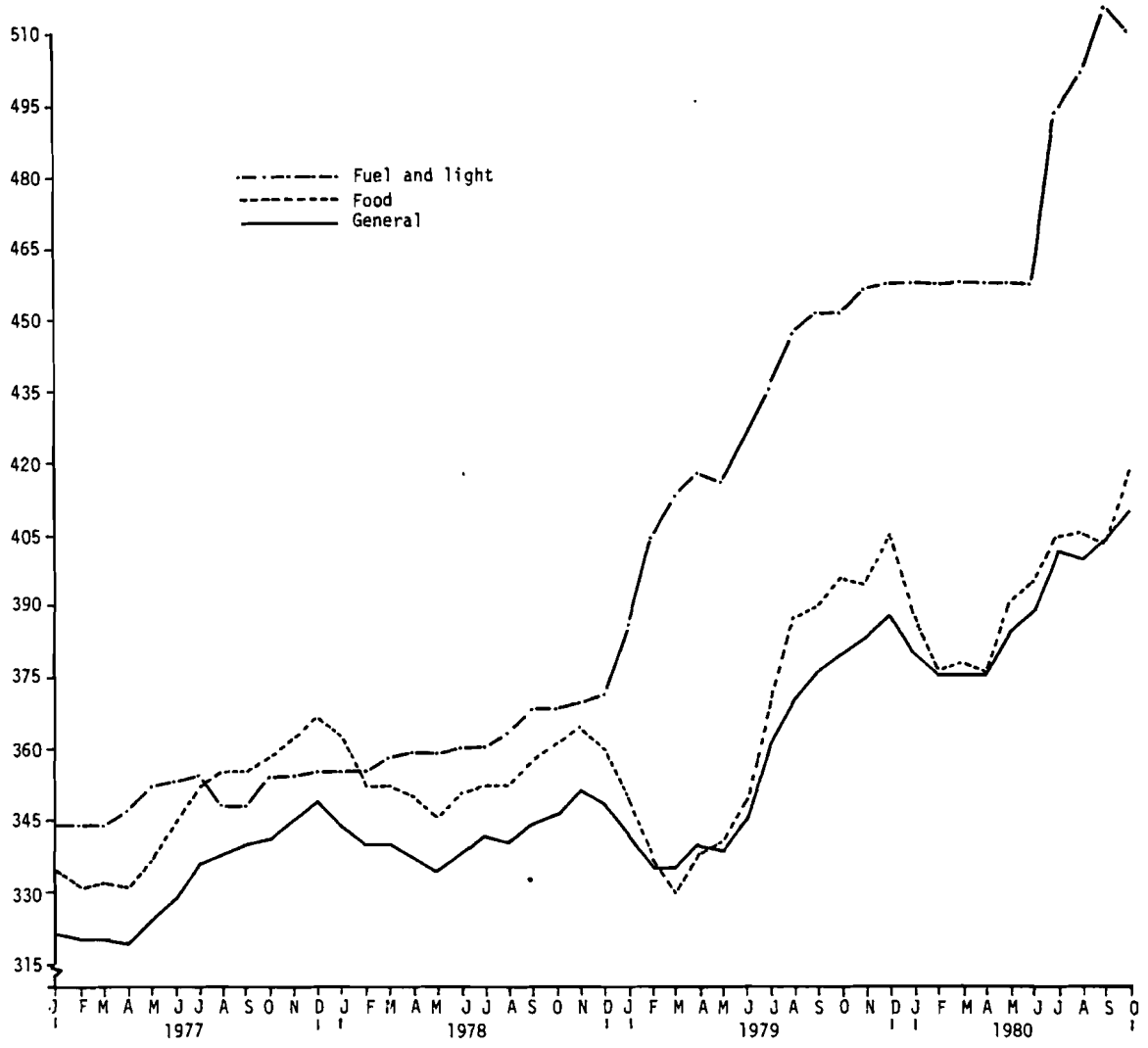
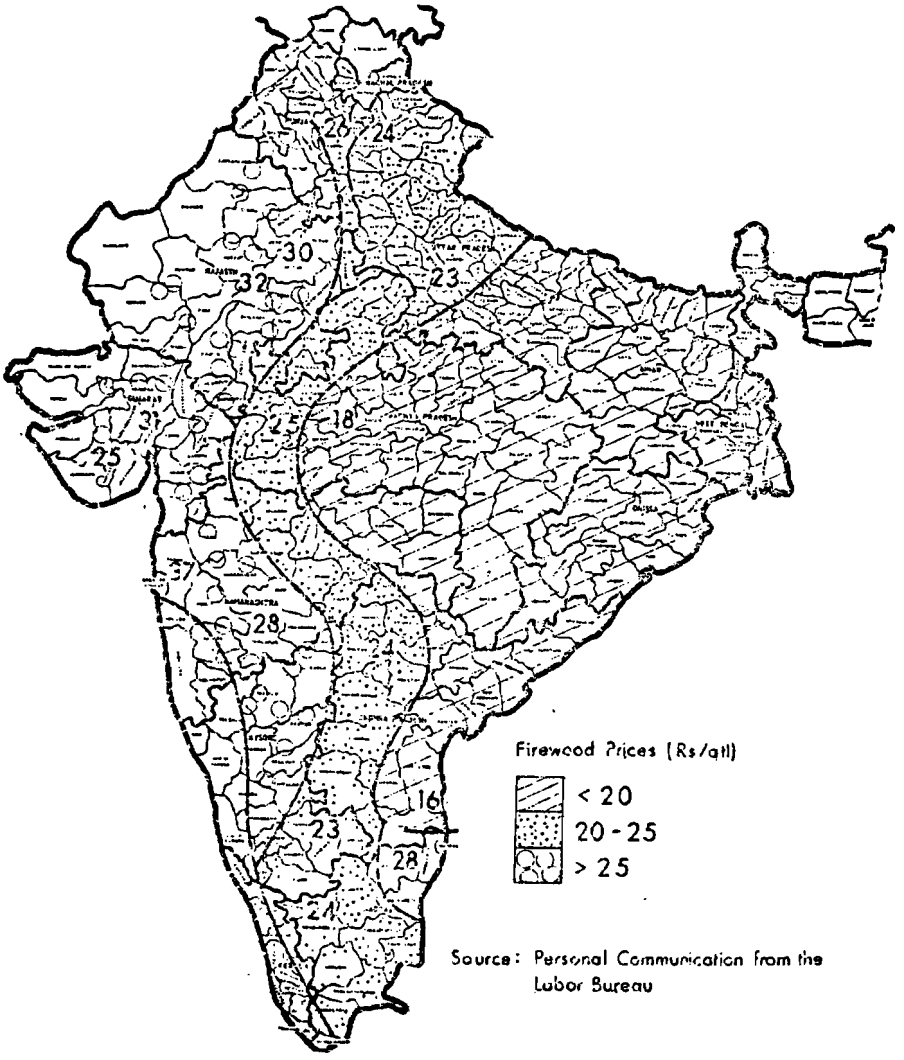


Figure 1. Monthly index prices for fuel and light against Food and General Price Index (for industrial workers in Hyderabad) 1960 = 100.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Firewood Prices (Rs/qtl)
< 20
20 - 25
> 25
Source: Personal Communication from the Labor Bureau

Figure 2.