

commercial landings during the peak period of the fishery. As pointed out by Panikkar,⁶ all previous workers are unanimous in ascribing the success of the oil sardine fishery to the abundance of the juveniles only. It is significant that the peak of the oil sardine fishery, when the juveniles dominate the catches, is reached during or immediately after the peak of *Fragilaria oceanica*. Further, a secondary maximum in the bloom of this diatom has also been observed during certain years accompanied by heavy landings of juvenile sardines. The influence of this diatom on the oil sardine was markedly noticed during the 1951-52 season when the fishery which was steady till October 1951, suffered a severe setback during the subsequent months owing to the scarcity of *Fragilaria* in the fishing grounds. The fishery revived with the reappearance of the diatom by the end of December 1951.

These investigations on the oil sardine and *Fragilaria oceanica* extending over seven years lead to the inescapable conclusion that one of the major factors governing the fluctuations of the oil sardine is the availability of *Fragilaria oceanica* which is its favourite food.² It was mentioned above that during the last seven years *Fragilaria* attained two outstanding peaks in the years 1949 and 1953 caused by the rejuvenation process in its life-history. It would appear that the bloom of 1949 may have helped

the recovery of the oil sardine fishery which was a continuous failure for several preceding years. This progressive recovery of the fishery culminated in the exceptionally good 1953-54 season, which coincided with the second outstanding bloom of *Fragilaria* in 1953, when the heavy landings composed of juveniles contributed to one of the most successful fisheries during the last quarter of a century. It may be pointed out that the next outstanding bloom of *Fragilaria oceanica* is expected in 1956-57 and this surmise together with the expected good recruitment consequent on the abundance of the spawners in the fishery of the current season, i.e., 1954-55, indicates a good oil sardine fishery during that season, provided the hydrological and other factors are also favourable.

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CONQUEST OF SOLAR ENERGY

THE harnessing of huge amounts of energy now going to waste in the desert and arid areas of the earth was the topic of a symposium held recently at New Delhi under the joint auspices of UNESCO and the National Institute of Sciences of India.

One of the most striking papers presented was that of Professor V. A. Baum, Head of the Helotechnical Laboratory at the G. M. Krzhizhanovsky Power Institute at Tashkent in the Soviet Union. With nearly a million square miles of arid lands, the use of solar energy is being treated as a major problem in the U.S.S.R.

In Tashkent, every square metre of land receives more than a million kilocalories of sun energy per year, and the Soviet scientists have succeeded in developing paraboloid reflectors ten metres in diameter which produce 100 lb of steam per hour at a pressure of 100 lb. per square inch. Such heaters have been used

for the operation of canneries, for distilling water, operating refrigerators, and for heating the laboratory. In another application, solar heaters have been developed to make fresh water from salt. A practical still of this type has been used to make 75,000 tons of distilled water and 12,000 tons of ice a year.

The U.S.S.R. State Optical Institute has constructed a number of solar kitchens using aluminium mirrors 4 feet in diameter which can produce 6 quarts of boiled water per hour. Work is now continuing to develop a solar steam generator which can be used as a heating plant in winter and a cooling plant in summer for cinemas, hospitals and houses. The development of ice-making and of air-conditioning is considered especially important in those arid regions where the suffering of the population from heat in summer is as severe as that from cold in the winter.