Reach for The Sky – Through A Lens

By Naazreen Bhura

In mid-1983, the 2.3 metres reflector telescope, the foremost optical telescope in Asia will become operational at the Kavalur Observatory of the Indian Institute of Astrophysics.

The telescope will be able to 'track' celestial objects with an accuracy of one second of an arc (which is a little less than a millionth of a full circle). It will see stars that are 315,000 times fainter than the faintest seen by the naked eye. And it will produce the results of observation in less than an hour.

The diameter of the new telescope's principal light collector, which is its primary mirror, will be 2.3 metres. The size of the mirror is important to an extent, as, the bigger the light collector's area, the more photons of light it can collect from celestial objects, and the better its capacity to 'see' fainter objects.

The moving spirit behind the new telescope project was the late director of the Institute Dr M. Vainu Bappu and it is not unlikely that it would be named after him.

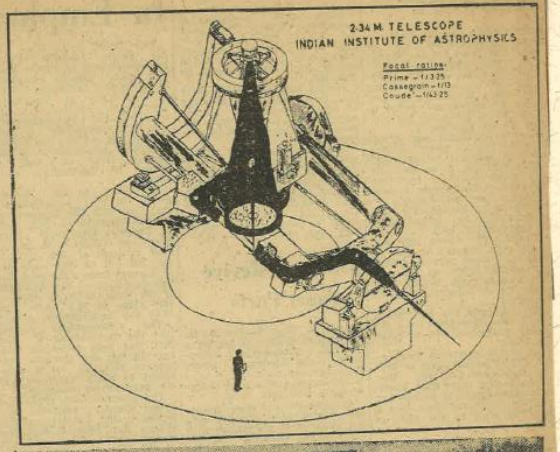
But it is not enough that the telescope should 'see' the objects, its data processing efficiency is equally, or even more, important. So, although the Soviet Union has the largest telescope in the world, a six metre reflector telescope India's 2.3 metres telescope will be equally good on account of its greater efficiency. This is because the Soviet telescope does not have a sophisticated computer system like the one envisaged at Kavalur, according to Institute sources.

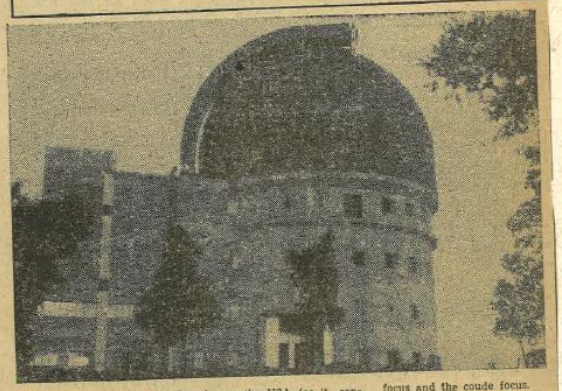
The Kavalur telescope will be operated by the VAX 11/780 computer. The system will initially have one million bytes of memory and 600 to 700 million bytes of disc storage. The interface CAMAC standard will connect the data acquiring instruments to the VAX. "By using this interface we are ensuring compatibility with the astronomical community at large. Through the CAMAC, information from the computers in developed countries can be processed at the Institute here" and vice-versa according to Ashok Pati, assistant researcher on the telescope project.

The VAX computer is capable of acquiring data from the most sophisticated detectors available today, of making very rapid computations on the spot and presenting the results to the astronomer in a tractable form.

This is largely through the use of the array processor and the picture processor which will be attached to the computer.

The array processor is a special purpose computer meant to do arithmetic at speeds of several million operations per second. What it can achieve in a few minutes of computation could in some cases take an hour or more with the VAX alone. The sophisticated state-of-the-art picture processing system will enable real time processing of picture and other data in an efficient manner.





Even in America the picture processor and the array processor are not attached to the computer which means that obtaining the results takes a few days, Pati said. So India envisages being a step ahead of even the USA (as its capabilities are today, in stellar research).

The present one metre telescope at Kavalur is at a disadvantage also because it lacks the prime focus which is ideal for photography of large areas of the sky. But now with the new telescope, the astronomer will be able to observe at three foci — the prime focus, the Cassegrain focus and the coude focus.

The Cassegrain focus with a smaller field than the prime focus has higher resolution and can be used for most of the photometric and spectroscopic studies at intermediate to higher resolutions. And for every high resolution studies, requiring long focal lengths; the Coude focus will be used.

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