

We now have plans to tap the talented school children who are interested in astronomy and give them training on various aspects of this subject. The Birla Planetarium attracts thousands of citizens to its shows on astronomy, and we hope that the day is not far off when every citizen of this part of India is aware of the basic concepts of astronomy.

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## A SERIES OF ASTRONOMY PROGRAMS FOR TELEVISION IN INDIA

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### 1. Introduction

Astronomy, unlike most other sciences, arouses great curiosity amongst laypeople. It is a subject that can be described relatively easily in public lectures. Distinguished astronomers like James Jeans and Arthur Eddington in the past and many more in recent times have “stooped down” to the public level to share the excitement of astronomical discoveries. Today, the popularization program normally proceeds in four different ways — through popular articles, public lectures, planetarium shows, and radio – TV programs. However, this overwhelming public interest in astronomy brings its own difficulties. Not all of it is motivated by a scientific interest! Many persons read mystic significance into astronomical findings. Many more are guided by astrological interest. Many fail to perceive the scientific basis for astronomy, a subject whose laboratory is the whole cosmos with objects too remote to be subject to scientific experimentation.

Thus “stooping down” to the public level is not so easy! In fact, I consider it more difficult to prepare a public lecture on an astronomical topic than to give a technical talk on a research problem. After all, in the former case one has to surmount the above-mentioned difficulties that don’t exist in the latter case. It is not surprising, therefore, that even today the number of really successful popularizers of the subject is small.

Yet, wherever successful, the rewards of such efforts have been great. The books and lectures of Jeans and Eddington thrilled an entire generation of educated public before the Second World War. I know several of my own generation who drew inspiration from Fred Hoyle’s lectures on BBC radio that were subsequently published as the book *The Nature of the Universe*.

Today the most powerful medium for mass communication is recognized to be television. How does it fare in the program of science popularization, especially in astronomy?

## 2. The Four Modes of Popularization

Before coming to TV *per se*, I wish to compare it with three other modes of popularization that I have used in my own limited efforts: writing articles, delivering public lectures, and preparing planetarium shows — in India where the literacy level is much lower than in the West.

Because of the lower literacy level, the written article has very limited impact. Articles written in English are read by a small fraction of the population, mostly the college students of science, faculty members of universities and research institutes, and a small fraction of the intelligentsia. I have found that my articles written in Marathi or Hindi have generated a greater reader response than those in English.

The same language barrier shows up in public lectures. Although a public lecture is localized, it can produce a greater impact than a written article with larger circulation. In a series of public lectures I once delivered in a rural town in India, the size of the audience grew with each lecture until, on the final day, it was estimated at 10,000. By then the venue of the lecture had to be shifted from an auditorium to outdoor premises.

The feedback from a public lecture — in the form of questions from the audience — is also more direct. While quite a few questions tend to be trivial or ill-informed, there are a few mature ones that well justify the efforts put in by the speaker.

Planetariums have become very popular in India, largely because the stellar roof brings astronomy manifestly closer to the audience. Planetariums can be effective in debunking astrological superstitions, although social pressures have prevented this from happening as fast as one would like. Inevitably constellations with their imagined shapes take a major part of a typical program. However, the excitement of recent astronomical discoveries (pulsars, supernovae, quasars, gravitational lensing, the expanding universe, *etc.*) is finding more and more time in the programs of the planetarium in Bombay, with which I have close contact.

It is against this background that one has to view the contributions of television. Again, I wish to describe my personal experiences in this field.

In the early 1980's, the Bombay TV station staged a series of nine monthly programs of 45–50 minutes duration on Sunday mornings. These consisted of discussions among 3–4 persons with one moderator. Slides were shown to illustrate certain points. The viewer response was generally favorable even though the program was screened at prime time. There were requests that the program (in Marathi) be repeated in English or Hindi on the national network.

In 1985–86, Carl Sagan's *Cosmos* was telecast. Each program was preceded by a 3-minute introduction by me in Hindi, summarizing the highlights. Many viewers found the Hindi introduction helpful in following the English commentary. The

program generated tremendous impression and illustrated the power of TV visuals in communicating astronomical concepts and facts.

### 3. A TV Series in Hindi

The *Cosmos* experience produced two negative reactions in the Indian context, however. Many viewers found the episodes too long to hold their attention. And, because it was in English, a vast majority of viewers could not benefit from its information content.

These reactions prompted me to propose a TV series in Hindi set against the Indian background, with a large number (about 30) of episodes of about 25-minute duration. Its aim was “education through entertainment” with promotion of the scientific temperament. Prime Minister Rajiv Gandhi immediately liked the idea and the Government of India asked the Films Division to provide all the facilities for the production of the series on 35-mm film. The National Council for Science and Technology Communication also advanced a handsome research grant for the research component of the project.

It has, however, taken longer than expected to arrive at a suitable concept for the series. My earlier attempt was to introduce two “gandharvas,” space travelers from Indian mythology, through the dream of a girl of 13. The girl has read mythology through comics and also some popular astronomy. She is faced with a conflict as to what is reality. She asks the gandharvas questions on stars, supernovae, quasars, and galaxies. They are foxed by the jargon and approach scientists for answers when they find that traditional mythology is insufficient to answer the girl’s questions.

This was a way of contrasting modern knowledge with mythology and superstition. However, trial episodes based on it created a conflict in the minds of lay viewers. Are the gandharvas real? If not, how do they meet real scientists? Do the scientists consider them real? Although the entire episode was in the girl’s dream, the confusion was serious enough to prompt us to shelve the idea.

In the revised format, we have adopted a “down to earth” scenario. In the opening episode, a schoolboy on his way to watch a solar eclipse on a school expedition to the local planetarium is admonished by his grandmother, who believes that an eclipse denotes an evil. The contrast between modern astronomical facts and age-old superstitions is brought out through demonstrations of working models and discussions in the course of the school trip to the planetarium.

We proposed to link two or three episodes in a story that seeks to bring about such contrasts in an uncontrived way.

### 4. Conclusion

It is too early to judge the impact of such a format. Less dramatic than the earlier one involving the gandharvas, it may deliver a clearer message to the viewers. The linking of episodes in one story may keep their interest alive. The real challenge, however, lies in educating them without disturbing their sensitivities.

(Note: The first episode of this series was screened during the colloquium.)

## Discussion

D. Brückner: *Do not mythology and astronomy form a complementary pair rather than a pair of opposites, and might not a complementary approach be more effective in presenting astronomy to the public?*

J.V. Narlikar: Yes, and in our present approach we are taking this into consideration, showing how both deal with the same subject in their individual ways, and so introduce the modern astronomical view.

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## THE MILLS PUBLIC OBSERVATORY IN DUNDEE

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The only full-time public observatory in Britain is the Mills Observatory in Dundee, Scotland. John Mills was a successful businessman in Victorian Dundee with an interest in astronomy. He bequeathed his money to build a public astronomical observatory in the city, for studying “the wonder and beauty of the works of God in creation.” The Mills Observatory was eventually opened in 1935.

Dundee is situated on the northern shore of the River Tay, in central Scotland. The Observatory stands on a wooded hill (an extinct volcano) near the center of the city. The trees shelter it from virtually all direct city light, while leaving an uninterrupted view south across the Firth of Tay. There is some scattered light, but in clear weather the sky can be surprisingly dark, and the Milky Way distinctly visible.

The Observatory is run by the City of Dundee District Council. It stays open till 10 pm, Monday to Friday, throughout the winter; in summer it is open only in daytime (at latitude 56°5 N it never gets dark in summer). There are just two members of staff, currently Fiona Vincent and Gary Hannan; between us we carry out all the work of the Observatory, from designing displays and giving public lectures to routine cleaning and maintenance.

The Observatory’s dome is 25 feet in diameter, and is made of water-proofed papier-mâché on a framework of steel ribs; it can easily be rotated by hand. The telescope inside is a 10-inch Cooke refractor, made in 1871, with the superb optics you would expect. It has its original clockwork drive, and it is still in very good condition; the telescope can be moved with one finger, and remains perfectly balanced in any position. With a focal ratio of f/15, it offers the high-magnification views of the moon and planets that are just what the public wants to see.