

and educational films which are telecast all over the country. In this connection, an acute problem faced by planetariums in developing countries is the lack of immediate access to important astronomical-event information. People look to planetariums, and not university departments, for information. And it is of vital importance that there should be an agency on the lines of the IAU telegrams that can transmit — at a price, if necessary — such information, preferably in layman's language, to planetariums.

The planetarium at Hyderabad for example receives even long-distance calls from people wanting to know where and when a comet can be sighted and so on. So the importance of such an international information facility cannot be overemphasized.

Another sad problem faced by planetariums in developing countries is the lack of resources to meet the need for take-away literatures, audio tapes, video cassettes, planispheres, books, souvenirs, and so on. The problem is even more acute in a country like India with its import regulations.

## **6. Leadership**

For developing countries, it is important that the established and successful planetariums should provide leadership for the new and also smaller planetariums. An acute problem in this context is the lack of trained personnel, for the simple reason that a planetarium culture is either non-existent or nearly so. With exactly this in mind, the B.M. Birla Planetarium, Hyderabad, has introduced a university-recognized post-graduate diploma in Planetarium Techniques and Management. This will, we hope, build up a cadre of planetarium directors and educators.

## **7. Conclusion**

Lastly, it should be pointed out that the success of a planetarium depends to a great extent on its showmanship and marketing ability. In fact, this task is easier in the developing countries, where media coverage is much more accessible than in the advanced countries. An author once advised novices that they should break their necks to get into print. A good dictum for a planetarium would be that it should break its neck or whatever to remain in public view.

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## **Follow-up remarks by Joseph M. Chamberlain**

My colleagues on the panel have presented an excellent cross-section of activities and opportunities in the teaching of astronomy through the planetarium medium. Since our time allotment is brief, I do not want to duplicate, but I would like to summarize two very attractive programs that are offered in several planetar-

ium settings, and to invite the cooperation of this group of astronomers involved in the more formal aspects of astronomy, and of others who may read what we are here presenting orally.

The first type of program that I have in mind is a series of lectures, demonstrations, and discussions for high-ability high-school students. One such program, known as the Astro-Science Workshop, has been offered in my own institution, The Adler Planetarium in Chicago, for twenty-seven years. I know of similar programs at the American Museum — Hayden Planetarium in New York and others offered on college campuses rather than in a planetarium. Typically, the students are juniors and seniors in high school, carefully selected and recommended by the head of the school science department. The program might be conducted on a daily basis in the summer or on Saturdays through the school year. The planetarium staff organizes the program and often presents many of the lectures. Professors from nearby colleges are invited to discuss their research interests. Sometimes grades are assigned; sometimes scholarships to colleges are awarded. Frequently, the planetarium program is accepted for advanced standing in the typical introductory astronomy course during the first year of college.

I encourage all of you here, and your colleagues elsewhere, to be aware of such programs, to participate in them if asked, and even to volunteer your services. Experience tells us that such programs have been effective in producing research-oriented astronomers as well as science-oriented professionals in other disciplines.

The other type of program that I wish to mention often comes under the heading of continuing education. A planetarium can offer a series of lectures or experiences ranging from elementary-level descriptive astronomy to advanced astrophysics, and even to special topics in contemporary astronomy. The students usually are planetarium members or astronomy aficionados who are participating simply because they are interested in the subject. At Adler, professors from the University of Chicago, Northwestern University, and elsewhere supplement the Planetarium staff as course lecturers. Similar patterns of instruction prevail at other planetariums. In recent years, I have found that even the busiest research astronomers are willing to share the excitement of their involvement in their astronomical specialty.

These continuing education courses are sometimes offered for credit through a college or university, but more often are set up on an informal basis that does no more than satisfy the curiosity of the participant. Some students are so diligent, however, that they continue to take such courses and become amateurs with advanced standing.

## Discussion

*C. Harper: Planetariums in the northern hemisphere should be urged to present to their audiences the southern sky — that is to say, the sky as seen from the southern hemisphere. Opportunities for hypothesis testing and an awareness of our global unity are important educational goals.*