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Editor's Message

For me, this will be an unusual Fall semester. For the first time in 15 years I will not be working under an indoor sky. There have been too many changes in Fairfax County; changes that I personally find unacceptable. Since 1962, the planetarium teacher's position has been a full time job with each of our planetarians (nine of us in this county) being assigned a number of high schools and elementary schools. This year, planetarium teachers are being given one of two possible assignments. They may be assigned to teach three periods in the classroom with the other half of the day being devoted to the planetarium. They are expected to handle the same number of classes in the planetarium they handled in previous years. The other possible assignment is to cover two planetariums with all of the usual number of high and elementary schools for both installations, and teach one astronomy course in one of the assigned high schools. I have been told to hang in there, hoping that someday the planetarium programs will be reinstated as they were before. I can't afford to do that; the waiting would only produce ulcers for me and I owe my family more than dedication to my job.

For all of you who will be back under a dome again this year, I wish you continued success. For those of you who are taking on this chore for the first time, I have something more than good wishes, thanks to Bill Rush of the Ritter Planetarium.

Bill has edited a rather lengthy paper entitled "Tips for the New Planetarian". It includes work from eight people and is much too long to use as one of the articles in our journal but it defies my attempts to condense it. I have split the paper and the first half appears in this issue with the second half scheduled to appear in the Winter issue.

With our next convention only months away, it is not too early to start making your plans to attend. You will find information concerning the meeting in the next two issues. I know I won't miss this one.

Keep those skies moving and let me hear from you.

Bill Fagan

THE DELIVERY SERVICE: MORE ON WHAT WE ARE ATTEMPTING TO DO ABOUT IT

Our survey to discover delivery intervals is in progress. A substantial number of members will find a postcard enclosed with this issue. Please fill it out immediately and return it, so that we can document our case to the U.S. Postal Service.

In some instances, where extreme delay is known to be common, the postal authorities have agreed to monitor the delivery of individual copies. Whether this helps or not, I have no idea. Nevertheless, we shall attempt to see where delivery is getting hung-up. The problem seems to be worst in the Northeastern part of the U.S. Here, in California, I've known members to receive the magazine in San Francisco (500 miles to the North) before I received my own copy mailed at the local postoffice two miles away. (We're looking into things of this sort, as well.) If your name has not been selected in our survey, but you wish to respond, please drop me a note with your own comments. Wish us luck.

Ronald N. Hartman
TIPS FOR THE NEW PLANETARIAN

Edited by William F. Rush

I INTRODUCTION

The new planetarian is almost always a person filled with questions, uncertainties, hope, and excitement as he assumes his new responsibilities. He wonders what is expected of him, where he will get ideas, and who can help him. There are no textbooks on being a planetarium director and people who can provide guidance are few and usually far away.

Recognizing the great difficulties that new planetarians face, the Education Committee of the Great Lakes Planetarium Association has prepared these tips to help you begin the job of being a planetarium director. To many questions, you will find that there are no single answers, for there is much room for individual style and choice of method in the planetarium. In order to convey this feeling and to avoid giving the impression that there is always only one correct way to do something, this booklet presents the views of many planetarians, many of whom look at the same question from different points of view. I suggest that you read these pages for what they are--tips from experienced planetarians to those just beginning. To answer the many questions which can arise in different institutions is clearly impossible, but it is our hope to provide some useful starting points.

In speaking of the audience for this article is intended, Jeanne Bishop, Chairman of the Education Committee, summarizes the feelings of the authors who have contributed their thoughts when she writes:

"Admittedly, there is diversity in what is expected from planetarium directors. Size of installation, museum or school facility, objectives of the larger institution to which the planetarium is attached, and funds and staff which one has at his/her command are determining factors.

"But it is not difficult to find common elements. Speaking from some years experience with both museum and school planetarium, serving large and small populations, we offer the following orientation to you who are about to become a 'dome-keeper.' (Our) remarks are directed to those who would be the only or one of a very few staff in relatively small installations.
"You are joining a world group of about 1,000 who have the job of planetarium director. Most of these people are the greatest anywhere, who will be glad to answer your questions and share their ideas and activities with you. Find out which planetariums are closest to yours and get to know the people in charge at each. Attend local informal get-togethers as well as regional and ISPE conferences to expand your idea horizon. Pretty soon you will be in a position to share your programs with the rest of us. We'll be looking forward to your contributions. Welcome to this exciting profession, and GOOD LUCK!"

II WHAT MAKES A GOOD PLANETARIAN

What is a good planetarium director supposed to do? Before concerning ourselves with the details of actually operating a planetarium, I think it wise to survey a planetarian’s responsibilities in general terms. In speaking of the planetarium and its importance, Armand Spitz wrote:

"What justification do we have for the planetarium? In the technical world of the future, much of the responsibility for financial support for research, development and education will fall directly on the shoulders of the taxpayers. It can categorically be said there is no type of organization better fitted than the planetarium to prepare the electorate to vote intelligently on the support of future scientific endeavors. The success of such ventures may well hinge upon the effectiveness with which planetariums have played their individual and collective roles.

"The fact must never be lost sight of that the planetarium lecturer has an unparalleled opportunity to achieve his goal, whatever this may be. Much factual data about the physical sciences can be presented palatably, wonder and awe can be created for the processes of nature and man’s fantastic ability to comprehend them. The planetarium can inspire almost to the point of being a semi-religious experience without being narrowed by sectarianism. It can be used to develop an appreciation of the abstract and give the most cynical members of the audience a sense of identity with other human beings who, like themselves, have the privilege of understanding something of the universe of which they are a part."

Discussing the planetarium director, Spitz has said:

"He must be able to combine popular presentation with scientific accuracy. Under his guidance the planetarium should be regarded widely as a dependable authority in technical matters. He must be prepared adequately to represent his organization before any type of audience, professional or non-professional."
Dr. Harry Crull, in speaking of what a planetarium director should be has remarked:

"I think in the first place a planetarium director need not be a professional astronomer. I say this advisedly. I have directed three or four planetariums over the past thirty-five years. I am a professional astronomer, but I think that this is unnecessary. Indeed, one must shudder to think what would happen to the planetarium community if some of our very good friends who are professional astronomers, were suddenly saddled with the responsibility that some of you have. The director must however, possess accurate astronomical knowledge, and he must recognize when he doesn't have the answer that he not try to invent one."

Despite the room for difference of opinion which will be found throughout this article, all planetarians recognize their heavy obligation to astronomy and the public. Jeanne Bishop stresses this point:

"Remember that you represent astronomy to your audiences and the larger population from which your audiences come. You are a public-relations individual for astronomy generally, planetariums generally, and your planetarium and its programs specifically. You have the awesome responsibility to understand astronomy and the scientific method and present programs which are accurate. They should also be balanced with respect to the sensational issues of astrology, extraterrestrial life, unidentified flying objects, and new, but as yet unproven theories (e.g., black holes). Remember that the posture of science is skepticism until verified."

Bearing these responsibilities in mind, what background should a planetarium director have? Jeanne Bishop summarizes:

"To illustrate how experienced planetarium directors view background for the position, I share the following results from a survey I conducted in 1967: The most desirable training experiences designated were astronomy and physical science courses and classroom teaching. Other characteristics judged important, and which are not obviously trainable, were speaking ability, appreciation of the scientific method and a respect for accuracy, imagination, and showmanship."

Although there is a diversity of opinion on many subjects expressed by the contributors to this discussion, there is unanimity on two characteristics which are required of good planetarians--respect for accuracy and the ability to hold audience attention. In writing about the planetarium director, Harry Crull has said:

"He must have many other sides than simply astronomical facet of his personality. He must have a sense of the theatre. I don't mean by this that one turns the planetarium into a grand show with no content and all facade but one must get the audience to listen before he can tell them much. If you are dull as dishwater, they do not listen."
This magical ability to hold audience attention comes rather naturally to some people, but must be cultivated by others. Each person will have his own style and approach, but some suggestions by experienced planetarium directors may help you to cultivate your ability to hold a high level of audience interest. Jeanne Bishop remarks:

"...An accurate presentation is sterile without program techniques which aim at relevancy. This is what makes a program "interesting." Of course, to achieve this goal, you must know your audiences. If you will interpret astronomy for children of different ages and background, talk with them, observe how they learn, and find out what interests them. Even high school students and adults do not all have the ability to make inferences about topics with which they are unfamiliar. Participation experiences (such as drawing star maps or locating constellations from personal copies, plotting moon phases with respect to the horizon of Zodiac stars, or role-playing situations) provide concrete experiences on which astronomical understanding can be built. For many adults relevancy can be achieved via passive participation, as evidenced by the psychologically well-planned programs of super-dramatist Jack Horkheimer, Director of the Miami Space Transit Planetarium. Length of presentation is important; one which is too long can kill interest. A program which is too short is always better from a motivational or interest standpoint than one which is too long."

All planetarium directors stress the importance of knowing the audience whose attention you want to hold. One method of getting to know an audience is suggested by Dan Snow in discussing school programs:

"In a school program, given at a museum, he thinks it best to find out how the planetarium experience can best help the class by asking the teacher directly; if necessary, this may be just before the program. This helps eliminate criticism of not getting what was wanted and helps make the experience more important to the class. Dan is opposed to any 'cut and dried' school presentations."

Another technique for achieving familiarity with an audience is suggested by Jeff Hunt:

"A good relationship with the people who come to your planetarium is essential for your planetarium's survival. At the beginning of your program, introduce yourself and your program. If your program is about comets, you might ask if anyone has seen one. If there is a positive response, you might ask the party which one he saw. You have probably seen how well television programs do that incorporate the audience into the show. People like to become involved in things of this nature. After the program is finished, you might invite questions, and finally thank the people for attending your show and invite them to come again."
"Recently, I attended a program at a large planetarium, and none of my ideas about proper etiquette were used. The operator did not introduce himself or say anything when the program was over. The lights were brought up and the doors were opened. Most of the people were not sure the program was over, while others were very dismayed at the whole situation."

I feel strongly that each planetarium program should be concluded with an opportunity for the audience to ask questions. In addition to injecting a personal element into the program and to clearing up any points on which the audience is unclear, such question sessions provide a very direct and useful audience feedback to the lecturer. He immediately learns what topics were not made clear to the audience and also discovers what the audience found most interesting.

Jeff Hunt cautions that planetarians be conscious of program length:

"The key to your program is attention. You want to grasp and hold the attention of your audience for as long as possible (which should be forty minutes). Overused words and special effects lose their impact with constant repetition."

Another factor important to hold the audiences' attention is the attitude of the speaker. Dan Snow remarks:

"A presenter should not take himself too seriously. Also, he should sometimes keep his mouth shut and just let the stars roll silently."

III GETTING STARTED

Once you have an idea of the general philosophy you wish to follow and know something of your audiences, it is time to begin dealing with the specifics. Jeanne Bishop has some suggestions on getting started:

"Assume that you will need to do many different things. Whatever you have learned previously may prove helpful in your new position. Take stock of your own skills as well as your contacts with people who have special talents. How do you score as a teacher, a dramatist, a journalist, a curriculum expert, a music buff, an artist or draftsman, a photographer, a mechanical engineer, an electrical engineer, and a reservoir of general creativity? If you lack some of these skills (half is about average among planetarium directors!), look for helpers.

"Get to know teachers, club programs' chairpersons, newspaper and radio contact people, and amateur astronomers in your area. Work with these people to promote your planetarium activities and serve them."

7
I suggest investing time in visiting the technical media department if your institution has one. Making friends with the staff can pay rich dividends when you need that special slide in a special hurry. Giving out free tickets to your program will help you make friends, will help build your attendance, and will help convey to the technical media people what your goals and needs are. If your school or institution has machine shops, electronics shops, woodworking shops or a newsletter, visit the staff of each to tell them what you are doing, giving tickets to programs to those who seem interested. Try to get listed in the "things to do" section of your local papers and make sure to send out a "press release" describing each of your activities.

If your astronomy background is not as extensive as you wish it were, Jeanne Bishop suggests:

"Review your astronomy by skimming a number of introductory college texts and current astronomy periodicals, such as Sky and Telescope, Griffith Observer, and Astronomy. Attempt to fill in gaps in astronomy knowledge as quickly as possible and continue to keep up with current events. Get on the NASA mailing list for educators. Check Scientific American, Science, and American Scientist for in-depth articles on frontier topics of astronomy. Critically eye astronomy content for interactive relationships with other topics and subjects."

Dan Snow recommends some additional sources:

"Reading books and journals is an essential part of a planetarium director's preparation. In addition to Stars in Our Heaven, Dan finds merit in The Star Lover, Watchers of the Sky, and Star Names and Their Meanings. A must for calculating local conditions of such events as eclipses and occultations is the American Ephemeris and Nautical Almanac."

I suggest joining your local planetarium association and I.S.P.E. (the International Society of Planetarium Educators), which includes a subscription to The Planetarian, a journal for planetarium operators. The Planetarian contains program ideas, technical suggestions, news, special effects projector plans, and much other useful information. To join ISPE, write to:

Mr. Walter Tenschert
Thomas Jefferson High School
6560 Braddock Rd.
Alexandria, VA 22312

Although at first it seems easiest to just remember where everything is, I recommend getting a good organizational scheme worked out as soon as possible. Records, spare parts, books, magazines, and slides should all have a place and be kept there. Slides should be marked as to subject and filed so they can be found, as your initially small collection grows. The same applies to tapes. Slide boxes with dividers are commercially available.
Jeanne Bishop has some additional remarks on what you can expect.

"Expect to sometimes stay at work late and go in at unusual times to set up for programs, make emergency repairs, and take care of tasks which pile up at an alarming rate in spurts. Try to work out a flexible schedule which allows time off in exchange for long hours during busy periods.

"You probably have several 'bosses.' Do strive to be on good terms with all. If inexperienced, earn your employer's respect in an established planetarium with suggestions for small changes and in other ways before suggesting large, expensive modifications. Always be tactful.""
AUTOMATION FOR THE PLANETARIUM

Sig Wieser

Calgary Centennial Planetarium, Calgary, Canada

Why all the fuss over automating planetarium shows? Every planetarium show in existence today features its own version of automation. At every presentation somehow, and usually in concert with the narration, visual effects pop on and off. The only difference lies in who or what does the popping. The programmed devices range from brain-washed technicians to self-contained narrators, from stepping switches to intelligent machines.

In the main, the degree of sophistication depends on the convergence of economics, of needs and of keeping up with the Halls and Rodgers of the planetarium world. Ever since the time when technicians fell asleep using the only two single auto-dimmers as pillows during my lectures, I have had visions of putting never failing, always alert automatons at my disposal. With covetous glances I evaluated all the sundry installations, and I arrived at a number of choices. The easiest of these is to forget the whole thing and invest heavily into training of octopus-lecturers with super concentration. However, this is also the most expensive solution requiring back-up and other frills. Then there is a concept hiding under the name of real time programming with the promise of a high degree of creativity given the one time service of the already mentioned super octopus. Finally, there is a way of programming the entire thing remotely without switching on a single projector, for later regurgitation on demand.

What do I want of our system, what should it be able to do? Obviously it has to handle all the existing control and power circuits for changing slides and lighting the lamps for instance. A count of the circuits revealed there is a chronic shortage in the present matrix provided by 40 dimmers and 10 relays over 120 load busses. An estimate of 400 load and control circuits appears more realistic. There may be two horizon systems, four dissolve systems, two all sky systems each demanding four circuits, one for light, one for slide change, one for fan control, one for reset. There may be two zoom systems each demanding six circuits. Special effects such as Orreries, Eclipses, Landers, may take up to ten circuits each. The list of circuits simply grows and grows. The next consideration concerns the length of the program and the associated switch functions.
A simultaneous storage of seven shows would be about 250 minutes long. Assuming that every minute of the show one effect switches on and off, a total of 500 switching steps are necessary. Therefore my system needs to accommodate a matrix of 400 circuits by 500 switching steps. This defines the size of storage required.

Perhaps the most important factor in all considerations is the method of loading this storage. A programming device could be made to follow a lecture during an actual presentation. Some like to call this "Real Time" programming. One or more operators record segments of the visual program listening to the narration. This process is praised as creative and artistically preferred. More suitable perhaps are descriptive terms as sloppy planning and as sentimental thinking. A sculpture may be artistic whether the hand smashes the hammer onto the chisel directly or an electric hammer is used. Furthermore, the real time process ties up dome time which is usually at a premium.

Therefore a preferable system is one of off-line programming. This allows careful plotting of all the effects without interference in regular operations. It does not require shut-downs for show change overs and especially effective sequences are easily and accurately copied.

Another controversial question is the choice between dynamic or static storage, that is between storage on tape or memory. Tape storage is convenient if done directly on the narration tapes. There are no synchronization problems, and the depth of the storage is practically limited only by the length of the program itself. However, a program is bound into its sequences. Tape breakdown also means program breakdown. Live narration must be accompanied by live operation. For special presentations, taped effect sequences are impractical and libraries of effect sequences do not make sense. Static storages need to be called cue by cue. While this may fragment shows into scenes, the access to the scenes is random. Narration tape breakdown still permits a live lecturer to take over and call automated scenes cue by cue. Indeed, this process allows a live narrator to present effects from a library of stock effects without regard to technical complexity. Obviously manual override in all cases is a must and in fact does not present a problem.

After all these decisions on the automation system are made, the reality of the market takes over. In tendering the only valid criterias after the consideration of size are the initial cost and consequent operating cost estimates. In other words, after investigating all the "druthers" one may still be stuck with the lowest bidder in the worst sense of the term. But this is just a precautionary note. Luck plays a great role. In Caloarv we have gone through the initial stages of planning and investigating of requesting bids and ordering. Here is what we ended up with. Ours will be a standard off-the-shelf, computer system with floppy disc memory. The heart of the system is the software copyrighted by Electro Controls. Cues up to 400 functions wide can be recorded and played back in or out of sequence.
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Cues can be assigned and reassigned for playback in any order. A Systems Load test may be carried out which should indicate disconnected power and control lines, burned out lamps and misplaced projectors within two minutes before the show.

Programs and individual cues may be erased, brightness of any circuit may be increased manually or dimmer assignments may be changed. Delayed cues may be programmed, fade count rates may be changed manually, displays showing dimmer assignments may be used for debugging. At any stage the monitors will display the present status. All programming instructions will be displayed in common day English. Any monitor display may be printed out on paper.

This equipment is compatible with existing dimming circuitry by providing a 0 to 15 volt direct current signal to control dimmers and solid state relays. Interfaces will have to be designed for slide changes, electro-mechanical relays and tape recorder functions. The cues will be initiated by pulses recorded on the narration tape. I had investigated other systems and indeed other tenders were submitted. However, our choice was clearly the most economical as well as the preferred method of automation.

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**NEW ASTRONOMY POSTAGE STAMP ANNOUNCED**

An announcement from the METEORITICAL SOCIETY states that "on or about January 20, 1978, Greenland will issue a new 1.20 KR postage stamp with a meteorite theme. The stamp will show a Greenland Woman Knife made from an Iron meteorite, a so called ufo, superimposed on a background of medium Widmanstätten pattern."

For information, please contact:

GRØNLANDS POSTVAESEN
STRANDGADE 100
1004 KØBENRAVN K.
DANMARK

Correspondence to the Society may be addressed to:

CENTER FOR METEORITE STUDIES
ARIZONA STATE UNIVERSITY
TEMPE, AZ 85281
The spacecraft sweeps across the dome, decelerates and hovers above a crater-strewn landscape. Slowly it moves across the landscape searching for a suitable landing site. Finally it settles slowly to the surface. Is this a scene from a science fiction movie, or possibly a sequence from a major planetarium? No, it's a special effect that you can have in your planetarium for about $25 and a small projector. Our Altitude-Azimuth Motion Projector consists of three basic sub-assemblies: the projector, the motor-driven mirror and the control electronics. Figure 1 shows the entire assembly, including the "joy stick" control.

We use a TMC projector because it is part of a standard system used in our planetarium. Other projectors, including Carousels, can be used, but they may require a larger mirror and a different mounting bracket.

The details of the mirror assembly are seen in Figure 2. The mirror is mounted on the altitude motor's shaft with a small aluminum adapter. Note that the mirror is totally supported by the motor's bearing. This eliminates the necessity of fabricating bearings, but it also limits the weight of the mirror that can be supported. We use a 10 cm square rear-surface mirror. A thin front-surface mirror would be superior, but ours works quite well.

The mirror, altitude motor and the right-angle mounting bracket are supported on the azimuth motor's shaft to again simplify construction. This approach requires that the entire altitude sub-system be balanced around the axis defined by the azimuth motor's shaft. We accomplish this by making the mounting bracket from the thinnest possible material, by cutting away any unnecessary metal and by adding a lead counter weight. The balance need not be exact, but it must be close as the motor has limited torque. You are close enough if the mirror rotates at the same speed in both directions when the system is tilted so that the azimuth motor is horizontal. A flat aluminum plate supports the entire assembly and it is attached to the projector by the tripod mounting socket in its base.
Figure 3 shows a schematic drawing of the control circuit. It is just two variable speed d.c. motor controllers (Deutschman, 1976) using a common power supply. The two control resistors R1 and R2 are combined in a "joy stick" similar to ones used in TV games. Moving the stick in any direction activates one or both of the motors and causes the reflected image to move in the appropriate direction on the dome. Wires from the control are connected to the appropriate motors by trial and error so that the image moves in the same direction as the "joy stick." We wired the circuit on a piece of perf-board which was then attached to the pins on the "joy stick." Wire placement is not critical; however, the switch should be placed in the A.C. line to keep the motors from turning when you want the image to remain motionless.

This special effect is easy to construct and will be useful in many of your shows. As they say on TV, "Try it, you'll like it!"

PARTS LIST

D1,2,3,4 - 1N4004 - 1 Amp. 200P1V diodes
D4,5 - 15 volt,.1 watt Zeener diodes
R1,2 - 1,200 ohm, 5 watt resistors
Rd - 100,000 ohm "joy stick." James Electronics
1021 Howard Ave.
San Carlos, VA 94070
IC1,2 - 741 opp-amp
M1,2 - 1 rpm, 12 volt d.c. motors. Edmund #41860

REFERENCE

The Value of the Planetarium as an Instructional Device

Dr. Edward D. Orten

El Camino College, California 90506

After writing some dozen papers, including a lab text, six practicums, and a doctoral dissertation, I've decided I'm going to write this in the first person and perhaps make a few mistakes.

I pulled some 227 transcripts of community college students who had taken the astronomy lecture course in the spring semester of 1975. One hundred thirty one had been taught exclusively in the planetarium. Ninety-six were taught in the regular classroom. They were chosen because many obvious factors were common. Both groups had the same instructor. He used the same lectures, same tests and materials. Both groups had very nearly the same socio-economic factors, such as being 71% anglo.

Fifty chi-square and "t" tests were run. The planetarium-instructed students showed superior performance in all fifty tests and significantly so in twenty-three of the fifty. Spitz and Zeiss should be dancing in the aisle over this finding. I have a great deal of confidence in this finding - it was done under the auspices of NOVA University, Fort Lauderdale, Florida. My Doctoral Committee was Dr.s Leland Medsker, Terry O'Banion and Jerry Garlock. Dr. Garlock is the Research Analyst for El Camino College and he personally supervised the pulling of the transcripts and the running of the Chi-square and "t" tests, often working fifteen hours a day.

All tests showed the planetarium student higher in achievement.

1. The planetarium student performed significantly higher in the Earth, Sun, Planets, and final grade.

2. The above average planetarium student performed significantly higher in the moon, sun and planets units.

3. The average planetarium student (GPA, 2-3), performed significantly higher in the earth and sun units and for the final course grade.

4. The below average planetarium student also performed significantly higher in the earth and sun units and the final course grade.

5. The male planetarium student showed performance significantly higher only in the final course grade.

6. The female planetarium student showed performance significantly higher only in the earth and sun units.
7. The planetarium student under thirty years of age nearly scored the jackpot scoring significantly higher in earth, moon, sun, planets units and in the final course grade.

8. The planetarium student thirty to forty years of age seemed to benefit least - scoring significantly only in the earth unit.

9. The planetarium student over forty years of age showed significantly higher performance in the final course grade.

My own personal point of view for the overwhelming victory of the planetarium is not that it makes concepts easier to visualize, but the student is coming to a different kind of classroom. He is coming to a church, temple, tabernacle, kiva, not just visiting someone else's church as an occasional visit to the planetarium would be - but this is his own private-inner-sanctum and now the proper learning situation has been established. When Reverend John Carr, Methodist Minister in Pasadena learned of this opinion he requested me to write an article illustrating that staying home on Sunday morning, listening to the great religious speakers on TV, cannot possibly do for you what actual attendance at your own church can do for you. If I'm right in this observation to quote HAWKINS on Stonehenge, "...and the odds are millions to one in my favor..." - perhaps Spitz and the others who manufacture planetariums could turn to geology, and the other disciplines, why not bring the beach, the desert, the mountains for the study of rocks inside the tabernacle. That isn't too much - the planetarium has the whole universe. A copy of my thesis may be had by writing, NOVA University, Fort Lauderdale, Florida, and Ortell's Observational Astronomy (1977), text written especially for lab classes. Just ask your bookstore manager to order five or more copies on consignment and Kendall/Hunt, Dubuque, Iowa 52001 will send you an examination copy along with the teachers' manual.

Some additional conclusions reached through the combined data of the community colleges involved were: the planetarium-instructed community college students were significantly higher in academic performance when compared to the regular classroom-instructed students. The evidence of this study indicated that high-ability students had a greater opportunity to be successful as measured by academic norms. It was interesting to note, that while the planetarium instruction showed significantly higher performance on less than fifty percent of the tests on no occasion did the regular classroom show superior performance in any degree. For this reason, the long range effectiveness of planetarium instruction is favored. Another factor to be considered is that the planetarium, like many special programs, has gone through an evolutionary process since its beginning. The purpose of changes in the planetarium was to improve its educational effectiveness for the community college. Thus, this study of one comparison of students should rightfully be only one aspect of a general program evaluation.

As a result of the findings of my study with respect to planetarium and regular classroom instruction I recommend that:
1. Support for planetarium instruction be continued.

2. The Physical Science Division offer additional astronomy courses for a second semester of study, so that some students may have the continued opportunity to be more successful than they might be in the college's regular classroom programs. An honors course for the high academic ability student is indicated.

3. The administration recommend significant aspects of planetarium instruction like the offering of varied learning activities and invitations for consideration by instructors in colleges without planetariums.

4. The planetarium instructors incorporate into the planetarium features which will enable students, especially those of low and medium ability, to gain more from planetarium teaching.

5. The instructors in planetarium instruction implement a system of communication with regular classroom instructors so that students who encounter subsequent difficulty in topics that are better treated in a planetarium may have the opportunity of a planetarium session.

I also recommend that additional research be done, especially to examine the following:

1. The effectiveness of planetarium instruction with respect to its specific goals.

2. The effectiveness of planetarium and regular classroom instruction using the criteria of this study, for students on the same campus.

3. The effectiveness of planetarium and regular classroom instruction using the criteria of this study, for students of various socio-economic strata.

4. The academic success of planetarium students who transferred to upper division colleges and universities.

5. The reasons students withdrew from planetarium instruction as compared to the reasons students withdrew from the regular classroom instruction.

6. The reasons low and medium ability students experienced less success than the high ability students.

7. The effectiveness of individual features of the planetarium classes like the examination of a closely simulated object.

8. Any differences in personality or attitude between planetarium instructors and instructors in the regular classroom.
Because the students in the population of this study selected to enroll in planetarium instruction, it cannot be concluded that planetarium instruction itself was the cause of the consistent and significantly higher academic performance of planetarium students. Likewise, because of the success of planetarium students it cannot be concluded that planetarium instruction is superior to regular classroom instruction because of its physical mobility. Nor did this study identify those aspects of planetarium instruction which were most influential in the students' academic performance. This study did show that a group of students were more successful academically than a comparable group of students who enrolled in the regular classroom instruction. That community colleges continue to support and encourage planetarium efforts as warranted by the results of this study. It is important that efforts to improve the quality of science education, for all students who enter the community colleges, be continued.
Participatory Oriented Planetariums Part 2

Sheldon Schafer

A Brief Negative Encounter With A Participatory Program

When introducing any new program style, a variety of positive and negative reactions may be elicited. Although experiments with participatory programming at Lakeview Center have been generally positive, several extremely negative responses arose from the introduction of "Storybook Sky" for first and second graders. Since similar reactions came from three teachers in two widely separated rural school districts, I felt their criticisms could not be filed in the "crank" category. Also, their criticism is, in a sense, a reaction to a more general change in program style which might easily be encountered elsewhere.

Some background on our situation might be in order. For thirteen years the Lakeview Center Planetarium offered one school show, "Family of the Sun," to all visiting school groups, regardless of grade. This show followed a fairly standard format: Introduction to planets, orrery, slides and some basic facts, planetarium becomes a rocket ship, roll stars, travel to planets, and more basic information on the planets, before returning to the earth. The groups visiting the planetarium represent schools of diverse backgrounds; Peoria is a medium-sized city, more sophisticated than most think, and about half of the visitation is from the city and suburbs, while the remainder comes from rural communities as far as 60 miles away.

An analysis of planetarium brochures nationwide shows that programs on the planets are frequently presented to the upper primary grades, while few planetaria present a program on the planets to the lower primary grades. As such, "Family of the Sun" is well suited as a general program for grades 3-6, but not for grades 1-2. It has also been my observation, having presented a "rocket ride to the planets" to young children before (including the "Family of the Sun" show) that it has as much educational value to the first and second grader as a carnival thrill ride. (This is not to say that the planets can't be taught to young students, but rather that a completely different format must be used.)

"Storybook Sky" is a simple star show for young people. It is patterned after a program presented by Dr. George Reed at the Spitz Summer Institute in 1973, and is similar to the section of "Finding Your Star"
headed "Making Up Constellations" presented at the Holt Planetarium of the Lawrence Hall of Science. Basically, after the sun sets, several constellations are identified and myths related, then the children are given a chance to make up some constellations of their own, these are pointed out by the students, and a story is made up by the students, line by line, to go along with their constellations. In all of my past experiences with this program, the reaction has been overwhelmingly favorable.

The criticisms leveled by the teachers (of first and second graders on their first planetarium visit) were as follows:

1. Too much time was spent questioning and answering.
2. The show was not visually exciting. (There were no slides or special effects.)
3. The show tended to involve only the brightest students.
4. The students didn't enjoy this show as much as they would have enjoyed "Family of the Sun." (The students did seem to enjoy "Storybook Sky" although the teachers did not.)

Two of their points were that this show was not the one they had seen and liked for the last 13 years. But, on the other hand, their main points were criticisms of discovery or inquiry methods of teaching, criticisms which are often encountered when a change is made from a traditional curriculum to an inquiry oriented curriculum. As such they are criticisms of the basic concept of participatory programming for the planetarium.

The whole incident raised a number of questions in my mind:

1. Should participatory programs be presented to groups from schools where traditional non-participatory curricula are still in use?
2. Are participatory planetarium programs appropriate as field trip experiences?
3. If a show does not seem to be particularly well-suited for a particular grade level, should it be presented anyway if the teacher desires?
4. On a field trip, is a planetarium show more for the education of the student, the entertainment of the student, or for the entertainment of the teacher? After all, if the teacher is displeased, will she ever bring the class back?
5. Does "Storybook Sky" have more educational value for a first or second grader than "Family of the Sun"?
6. Is it possible for a planetarium to please everyone?

There is, of course, no one answer to these questions since each situation is unique. If, however, the situation hasn't occurred at your facility, it may be worthwhile considering your own answers in your particular setting before you are pressed for a solution.
UFO's: A PROBLEM FOR SCIENCE—AND
THE PLANETARIUM

Jack A. Dunn

A recent article in the Fall/Winter 1975 issue of The Planetarian was devoted to the question, "Should We Do Shows on UFO's?" The author took many of us to task for being unscientific. He felt that since such programs, no matter how fair, made some people associate UFO's with space and astronomy, this did a great disservice to the science of astronomy.

Let's look at some assumptions that Dr. Verschuur has made about the planetarium and its programming. I am not interested in debating what UFO's might or might not be. Even though Dr. Verschuur decries the use of such debate in any opposition to his proposal, he himself is guilty of entering the debate by entertaining such remarks as: "perpetuating the myth that UFO's are objects from space."

He starts by stating that the "prime function of most planetariums...is to present astronomical knowledge to the community it serves." This indeed, was the main reason that most planetariums were established, but could it be that they are progressing beyond this noble goal. We have seen, in planetariums large and small, how the planetarium has progressed to be a center of scientific and perhaps cultural expression. Planetarium professionals have found it necessary to broaden their horizons to cover many other sciences such as chemistry, biology, meteorology, anthropology, and ecology. Planetariums have been used as environmental theaters for music and drama. Dr. Verschuur attempts to address only that function of the planetarium which involves communicating science, but ends up condemning all other uses. Can we do programs on architecture, death, or psychology? - Yes. University architectural students produced a program on Buchmeister Fuller in the planetarium (what better place for this than in a dome!). John Williams has done an excellent program at Richland College on death and the universe. We challenge our audiences with ideas, not just facts - ideas that make those audiences investigate their feelings and emotions, and why they have them. These too are very definitely a part of the UFO story. But what is a responsible attitude in this controversy?
I believe Dr. Verschuur is exaggerating our importance. Are we so omnipotent as to give people what we think they need rather than considering their wants and needs? It is true that no matter what we present, some portion of the audience will believe that UFO's are really flying objects that have to do with astronomy or space in some way." I argue, however, that those same people and many others (who don't come to our programs) are going to think that way anyway. The general populace connects UFO's with space and astronomy. As communicators of astronomy we are the most visible reference, and so they come to see us. Is it being truly responsible to turn their questions aside and ignore them? The authors of the "Humanist" statement did not feel they could ignore the vast interest in astrology, and so they addressed themselves to the subject. Should we argue that they were wrong, because, by speaking out on the subject they stirred up interest in it? Certainly they have opened various news magazines to the astrologers for "equal time rebuttals." No, we cannot close ourselves to the public interest. They pay our salaries not only directly but indirectly. It was their interest which opened the doors of the planetarium in the first place. We have a duty to address ourselves to their questions. And we had better be well prepared for those questions. Research for such programs must be thorough and in depth. You cannot prepare by reading one book by either NICAP or Phil Klass. It is true that UFO's represent a problem for science. By definition they are "unknown." As phenomena they resist the normal observational, experimental pattern of scientists. One cannot study them in a laboratory. This needs to be explained to the public looking for simple, easy answers of one category (extraterrestrial hypothesis, hoaxes, mistakes, etc.). In doing a fine job of stating why scientists have problems with UFO's, Dr. Verschuur has made an excellent case for a planetarium program featuring just those aspects he mentions. Ignoring a subject is not going to make it go away - it only opens the public mind to the unprincipled bucksters who do peddle pseudo science with an eye to the fast buck. We are the voice of astronomy - and in some ways the most visible spokesperson for science. We cannot provide answers to all the questions in the universe, but we can promote the understanding of those answers we do have - and maybe see to it that some of the right questions are being asked.

The PLANETARIAN would like to know what YOU are doing. Send your comments to William Fagan, the Executive Editor, address given on page 1 this issue.

MOVING?

Please be sure to give us a CHANGE OF ADDRESS. Send old mailing label and new address to Ronald N. Hartman, ISPE Circulation Director, Mt. San Antonio College, Walnut, CA 91789.
A Review of Close Encounters...

Jeff Schroeder

Mt. San Antonio College Planetarium, Walnut, CA

It was with a feeling of intense anticipation that I found myself standing in line outside the Cinerama Dome in Hollywood. It was one day after the opening of Steven Spielberg's "Close Encounters", a motion picture that had been shrouded in such secrecy before release that I was expecting another "2001" at the very least. I had purchased tickets that morning and had to wait until five to see the film. I spent the intervening time strolling Hollywood Boulevard (most entertaining in itself) thinking about how science fiction had finally come of age, first "Star Wars" and now this. It was a potentially fatal overdose for a longtime S. F. reader like myself.

Inside at last, I reminded myself not to expect a shocking, all stops pulled "Star Wars" opening. However, the beginning of "Close Encounters" was a most unpleasant surprise. I have never seen a motion picture so thoroughly self destruct in the first five minutes. The most intensely frustrating thing about the production was that it showed the potential of becoming a truly great film. It was about a most profound moment in human history: first contact with an alien intelligence. However, it was crippled by an absolutely abysmal plot.

In the first segment, a never explained group of investigators find five WW2 vintage torpedo bombers in the Mexican desert. The planes are in excellent condition and the serial numbers match those of planes lost in 1945 over the Bermuda triangle.

Roy Neary, a Joe Average type played by Richard Dreyfuss, has his close encounter and is obsessed by an image implanted by the aliens. A few others are also affected by encounters, including a three year old child who is taken away from his horrified mother (not forcibly) by the aliens. These various plot lines are brought together at Devil's Tower, Wyoming, (which was Roy Neary's vision) the site of the aliens' landing.

The first beings to disembark from the alien mother ship are none other than the pilots of the missing aircraft which were found at the beginning of the film. The pilots are followed by all the other humans who had disappeared under mysterious circumstances. This totally ruins the flavor of the first contact. It also ruins the credibility of the film.
The individual scenes range from superb to absolutely inexcusable. The religious implications shown when the chief alien steps off the landing ramp, following the returned humans, and holds his arms outstretched against the brilliant backlighting, goes beyond bad taste. Many of the technicians present at the site of the aliens' landing appear unrealistically disinterested in the sight of a giant spacecraft floating overhead. Lastly, a cameo appearance by UFO researcher, Dr. J. Allen Hynek, near the end of the film is a little too obvious.

On the plus side, the contact with the aliens is entirely peaceful. There are no guns or violent scenes; the humans abducted earlier are returned, and Roy Neary willfully goes with the aliens when they leave.

The comic touches are very good. During the alien landing, one man, unable to take it, hides in a portable toilet. Another man, amid dozens of sophisticated, whirring cameras, shoots away with his instamatic.

The special effects are basically good and the alien ships have a pleasingly novel appearance. Instead of the usual detailed solid objects, they are little more than moving, constantly changing clusters of lights. There are a number of slips, however. The installation built at the base of Devil's Tower for the meeting with the aliens is rather obviously fitted into a matte painting. The large mother ship changes scale in relation to its surroundings and during one closeup is no more than a big model in appearance. The effects, basically difficult in execution, lack the fine attention to detail and realism apparent in such films as "2001: A Space Odyssey" and "Star Wars".

When compared with "2001", the only other major motion picture dealing with contact between mankind and an alien intelligence, "Close Encounters of the Third Kind" comes up a poor second. The plot of Close Encounters, while not as difficult to follow as "2001", suffers from too many loose ends and unanswered questions. Also, Director Spielberg flirts with mass appeal at the expense of believability by attempting to explain well known past UFO sightings and disappearances.

In Stanley Kubrik's "2001", a powerful unseen intellect guides the long term development of the human race. In contrast to this, Spielberg's benignly superior aliens seem almost playful. In both films, mankind is portrayed in an inferior position. Spielberg makes it even more noticeable when one of his characters states "Maybe Einstein was one of them".

Why must we have this pessimistic attitude toward ourselves? I would like to see a motion picture that would portray mankind on an equal basis with an alien civilization. A novel such as Arthur C. Clarke's "Childhoods End" would be an excellent choice on which to base such a film.

With the recent upsurge of interest in science fiction, we may look forward to other films dealing with the subject of first contact with an alien race. "Close Encounters" remains a 'not very serious attempt at dealing with a serious subject.'
We regret there will be no JANE'S CORNER in this issue. Jane took the advice of the ad shown below, and left with her skis for Mars, now that she has seen patches of White in some of the Viking lander photos. Send her some humor, and she may soon return to these pages!
COPYING PORTIONS OF 16mm FILMS TO 8mm

Robert Allen

Physics Dept., University of Wisconsin, La Crosse

Many planetariums either own or have access to 16 mm and/or 8 mm movie projectors. There are many excellent films available in both formats. Some of these films can be used in their entirety in planetarium presentations, while for others only portions may be suitable.

The cost of the films can be prohibitive, especially in the case of 16 mm ones. Typically, a 25-minute, 16 mm NASA film costs about $125 while a commercial film of the same length runs about three times this amount. Specified segments of NASA films can be ordered at a cost of about $0.33 per foot of color film, but even this adds up quickly.

For those who own or have access to an 8 mm movie camera, there is an alternative to purchasing these films. A good new super-8 camera requires an investment of $300 to $400, but used cameras can be obtained for somewhat less than this. (We purchased a used Yashica LD-8 camera with an 8 to 1 zoom ratio for $125.) Even if your planetarium can't purchase a camera, someone on your staff or a friend might have one they wouldn't mind seeing put to good use.

Two other pieces of equipment are necessary to prepare for copying. The most important is a rear-screen viewer. We use a Sawyer Mira-Screen Viewer (available from photographic stores for about $30). The other is a mirror. This is only necessary if there is writing in the scenes or if you are concerned with orientation.

The final prerequisite is a film and permission to copy. In the case of NASA films, the better ones are used heavily and must be booked several months or more in advance. Permission to copy portions of these films for educational purposes can easily be obtained from NASA Headquarters. They ask us to inform them after copying which sections were duplicated.

Arrangement of the 16 mm projector, mirror, screen, tripod, and camera is illustrated in the accompanying photo. (Note: The screen shown in the photo is not the one mentioned above, but another we experimented with for awhile; the arrangement is the same.) First the movie is projected onto the mirror and then the screen or directly onto the screen.
We use masking tape to place the screen in a vertical position after removing it from the viewer with four screws. The camera is placed on the opposite side of the screen from the projector.

We find that best clarity is obtained when the camera is fully zoomed. It is best to get as close to the screen as possible so that the image has maximum brightness. However, there is a minimum distance for which the camera will focus. Experiment to find the best location for your camera.

The most critical part of the copying process is focus. Both the 16 mm projector and 8 mm camera must be focused as well as possible.

Some of our copied films have shown obvious flickering, possibly due to synchronization between the projector and camera. However, there is no way to control this at the time of shooting. A small amount of flickering can be seen in many of the copied films, but we have found it to be quite acceptable for our purposes. Try a trial roll of 50 foot film (we use Ektachrome with an ASA of 160) and see what results you get. Hopefully you will be rewarded.

As a final note, you might also try projecting 35 mm slides on the screen and doing zooms and/or pans to create your own films from your slide collection.
Information For Contributors

(Effective September 1, 1977)

GENERAL INSTRUCTIONS

All materials submitted will be considered. Contributions should relate to one or more of the following: planetarium activities and/or education, astronomy or space sciences.

Articles, reports, planetarium programs, letters, technical comments, guest editorials, items of humor, pictorials (black & white) of selected planetarium-facilities, and general news relating to the planetarium/astronomy community is published. (This list is not all-inclusive.) The PLANETARIAN will make the final decision as to appropriateness of material submitted.

All material should be submitted directly to the Executive Editor. Contributors will be notified of acceptance, rejection, or need for revision within a reasonable period of time.

The manuscript should be typed free from errors, double-spaced, on 8 1/2 x 11" paper. Typeovers and other markings are to be avoided. Use the first page to show the title, author's name, complete address, and exactly how the byline is to appear. Begin the text on the second page. Place all legends for figures on a separate sheet at the end of the manuscript, and enumerate in the text where each figure should be located. Place all tables in the manuscript in their appropriate locations.

Photographs must be black & white, on 8 x 10" glossy paper. DO NOT mark or label on photographs. Labels referring to a part of a photograph should be indicated on a separate sheet or onion-skin overlay.

Line drawings, charts, and similar drawings (excluding halftones) should be drawn with dense black (preferably India) ink with a high carbon content. If only printed copies are available they must be equal to the above specifications. Copies duplicated on electro-static type duplicators are not acceptable. DO NOT SUBMIT COLOR WORK of any kind.

REFERENCES should appear in the body of the manuscript by the Author's last name and the date of the publication, e.g.: (Nelson, 1972), with full references listed alphabetically at the conclusion of the manuscript, giving author's name, year, title, publication, volume, number and pages. Example:


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