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Position Exchange Proposed

In the December 1989 issue a number of committees were listed, with contact people and possible contributions to IPS. I'd like to offer some suggestions from my committee members about exchanging information, possibly personnel.

This committee could act as a clearinghouse for temporary positions. Much as Don Hall’s excellent jobs clearinghouse, this one could serve those of us who could "trade places" for a specified period of time—a month, six months, a year—something like a sabbatical.

For planetarians in school systems, perhaps a season of exchanging with another place could give some fresh perspectives. There would be the red tape of teaching certificates to work through. Anyone think it’s worth a try?

What about setting up situations for volunteering some time if you’re “in the neighborhood” for an afternoon or a few days? Not necessarily swapping, but helping out.

Perhaps situations outside the planetarium would be possible, perhaps in an observatory. I have a contact in New Zealand who would like to trade places with someone in the United States or Canada for a year.

Another possibility for information exchange might be a “sister planetarium” program. Planetariums around the world might pair up—large staff with small one, school with museum, Western with Eastern, and so on. Simply writing or calling each other with ideas can foster closer ties in this profession.

Elizabeth Wasiluk, one of the committee members, further suggests a teleconference, perhaps between school children at the two facilities, who’ve seen similar or identical planetarium programs. The Challenger Center group has done something similar in sending out activities for students to do in the classroom, broadcasting a program by satellite, and taking phone-in questions from schools around the country during that program.

Of course, anyone participating in these programs must be a member of IPS.

If you have suggestions or interest for any of these ideas, please let me know. Thanks!

April Whitt
Adler Planetarium
Chicago, Illinois

Nothing New in Historian’s Evaluation

One has to express astonishment that an historian of Dr. MacDonald’s stature would submit an article for The Planetarian [March 1990] that is so out of date that one wonders if Dr. MacDonald has consulted a single work on the nativity since 1972 (the date of the latest publication he cites). Without citing any up-to-date material, he takes six pages to tell us that the account of the Christmas Star is either an allegory or a miracle. He provides no new contribution whatever towards solving the historical problems associated with the nativity of Jesus.

However, a major academic conference was convened in December, 1983 at Mississippi State University to discuss the important historical considerations regarding the nativity. This was chaired by Professor Jack Finegan (the renowned New Testament historian and chronologist) and attended by a number of professional historians from around the world. I was asked to attend that meeting and spoke before the assembled group and took part in all the professional sessions. Though there were expressed a wide variety of opinion on the historical and biblical evidences for the nativity, I know of no one who attended that conference who did not express a belief (and certainly a hope) that the historical account of the nativity was capable of being demonstrated. None of the scholarly participants at that conference either expressed in plenary meetings or to me privately that they thought the nativity narrative was mere allegory or simply miraculous as Dr. MacDonald suggests.

As a consequence of that conference, a book was published in late 1989 titled Chronos Kairos Christos which presents the scholarly papers of that conference (and mine is included). This book is published by the prestigious firm Eisenbrauns as a Festschrift in honor of Dr. Jack Finegan. And neither in this new book did the historians and astronomers suggest that the nativity narrative was allegory or thoroughly miraculous.

The solving of the matter is clearly an historical one—and it can be solved. A major contribution toward understanding the problem has been the astronomical discoveries within the last 15 years that have shown the outstanding celestial displays that took place in the years of 3 and 2 B.C. It is now absolutely essential that historians consider the impact of these astronomical occurrences because they dovetail so nicely with several aspects of what Matthew said concerning the Star of Bethlehem.

Indeed, the historical evidence (both secular and biblical) is so profound in supporting the period of 3 to 2 B.C. that I wrote a book in 1980 titled The Birth of Christ.
Ernest L. Martin
Portland, Oregon

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PROMINENT PLAINS PLANETARIAN PASSES AWAY

Dr. Gilbert Lueninghoener, dean of the Great Plains Planetarium Association, passes away Monday, February 5th. Dr. L., as most people called him, was active in the planetarium field from the early ’50s on until he turned 86. Dr. Lueninghoener would have been 89 on February 16. Dr. L. was associated with Midland Lutheran College, Fremont, Nebraska for nearly 70 years as a geology instructor, astronomy instructor, and planetarium director.

In the early ’50s he was a consultant to many of the institutions building planetariums in the Nebraska area. He was instrumental in the planning of Mueller Planetarium at the University of Nebraska, the Til Sanford Planetarium in Cherokee, Iowa and the Lueninghoener Planetarium at Midland. He also was an advisor to most of the planetariums constructed in the Nebraska area during the ’50s, ’60s and ’70s. Dr. Lueninghoener was a long time member of the Rocky Mountain Planetarium Association, and the International Planetarium Society.

During the 60’s and 70’s Dr. L. hosted the Rocky Mountain Planetarium and assisted in hosting the Great Plains Planetarium Association. One of his greatest joys was to show his Planevista system: a system of three matching 35 mm slide projections onto the dome. The result was a nearly 12 foot by 36 foot span that was not distorted and was sharp to the edges. Planevista enabled Dr. L. not only to bring the universe to the planetarium but also geology and geography. His planetarium work became interdisciplinary and served the Earth Science and Humanities programs at Midland. Dr. L. traveled thousands of miles taking triad slides of the geology and geography of the west. Dr. L. hand mounted and masked all slides correcting for the curvature of the 9.2 meter planetarium dome.

Dr. L. officially retired in 1972. When asked about this as late as the early ’80s, his response was: “Yes, the college retired me; that means they stopped paying me. It does not mean I have stopped being a planetarian.” And that he never did. Just two days before his death, we had a long conversation about the “threats” to the integrity of the planetarium. He was concerned about the resurgence of creationism and the accuracy of information presented in planetariums.

Besides being a creative and innovative planetarian, Dr. L. was a gifted teacher who made lasting impact on those fortunate enough to study under his wise tutelage. As Midland’s President said at Dr. L.’s funeral: “He loved not only his subject matter; he loved his family; his colleagues and friends; the Creator-God whose universe he studied and explored.” His philosophy of life was summarized in his design of the clock located on the front of the Swanson Hall of Science. The overall design is that of a stylized symbol of a star. Dr. L. described it this way: “The face of the clock represents time; the circle, eternity. The vertical and horizontal bars suggest the cross of Christ. Reality has two sides: the physical involves matter, energy and time. The spiritual is concerned with the cross and eternity.”

Dr. L. was about 10 years old when Halley’s Comet appeared in the turn-of-the-century skies. He described it as one event that made him want to be an astronomer. However, when it returned in 1986 he was concerned with the accuracy of all the quotes in the media from eye witnesses to the previous event. Doc took in all the inaccuracies with some disgust and then became resigned to view it all with the sense of humor that was unique to him.

Dr. Lueninghoener’s legacy lives. It lives in the planetarium named after him by alumni before he retired. It lives in the design of the campus observatory. It lives in the lives of those of us who were his students. It lives in the lives of all of us who were privileged to know him.

The advertisement below will raise some eyebrows, and the first question that many readers will ask is why it appears in this magazine. Advertising Coordinator Suzy Gurton's initial reaction was to reject it as unsuitable, and so was mine, but then I thought about it a bit. This is not a general circulation magazine, and the readership is not going to be fooled. That gives us options. First, we might appreciate the irony of their choice of publications. We might also examine the ad as a sample of what the public is exposed to, and treat it as an object for study. Personally, I am delighted that a portion of their advertising budget is going to support the goals of the International Planetarium Society by defraying publication costs of this journal.

This issue is shorter than average. I suspect that many potential authors are saving their material for delivery at the conference in Sweden, and that we might see a short issue or two before people generate additional articles. People who are not going to Sweden should keep The Planetarian in mind.

Mark Sonntag, Associate Editor for the Focus on Education column, writes that his workload is increasing and that he would like to step down. He has edited Focus on Education since 1980, and has our appreciation for a job well done. He offers to stay on on an occasional basis until a replacement appears. Would anyone like to volunteer? My thanks to Mark for his years of service.

I'll see many of you in Sweden. May the conference go well! And here's hoping for some sunshine on the morning of the 22nd.

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The projection planetarium was invented 65 years ago; meanwhile, planetaria have become part of public life in most countries. Large planetaria having projection domes around 20m in diameter record between 100,000 and 300,000 visitors per year. People attending planetarium shows worldwide may be estimated to total more than 30 million per year, a number that will grow as new planetaria are opened—sufficient reason to have a look at the application side of the planetarium and to analyze the demands society places upon this meeting place of man and universe.

The word “planetarium” means different things. It may denote a device, a building or an institution. Originally, the planetarium as a device was a mechanical model illustrating the motions of the planets about the sun and also known as an orrery. Today, a planetarium is generally taken to mean an optical projection machine.

Although all projection planetaria are descendants of the Model 1 planetarium built at Jena in 1923, no two of them are alike. They differ not only by size, technical outfit and capabilities, but also by their public efficiency.

It is the large public planetaria with their high attendance figures that dominate the general notion of a planetarium. The smaller school planetaria are often semi-public, serving specific teaching purposes and offering public shows in addition. Planetaria at marine schools or astronaut training centers are closed to the general public. Without underrating the importance of the latter, there is no doubt that the image of the planetarium in general is formed by the public institutions.

Still, at the end of the eighties, there are a great many people who have but a vague idea of what would be expected of them in a planetarium. Why is that so? We cannot overlook the fact that the mass media—press, radio and TV—still regard the planetarium merely as a marvel of engineering, while failing to see it as a cultural medium of its own. Critical reviews of planetarium shows—alogous to those of films or theater performances—are still lacking in the culture columns of the media. In fact, the promotional literature published by planetaria themselves frequently does not go beyond a mere functional description of the “sky machine,” spreading before the reader all its parts—the lenses, motors, gears, controls, microcomputers, etc. I am not saying that there is no great public interest in the
a generalized form or by examples.

The past has shown that the planetarium cannot ignore the general habits of communication (including their changes). A program resembling a lecture fails to meet the visitors' expectations. Subjects, methods and forms of presentation should consider current tastes, trends and vogues, as well as topical events. Our communicative habits are influenced by exposure to cinema, television, and an incessant flood of stimuli in general. The planetarium is challenged by this not to allow its presentations to be less exciting, colorful, vivid, original and entertaining, nor less topical informative and knowledge-imparting than any other medium or art.

Our environment is extremely complex and variform. The present time is marked by the increasingly global character of social processes. Those who occupy their minds with the universe show that our blue planet is but a speck of dust in the boundless space. And yet, it is by no means unimportant or negligible. It is marvelous and unique in that it carries life, crowned by the unique species of homo sapiens. Mankind has reached a stage of development in which it is able to exert a common effort to change the course of its history. The new quality of history-making lies in its global dimension and the high degree of consciousness. Objective processes such as the scientific-technological revolution and the new quality of modern productive forces call for a hitherto unknown internationalization also in the field of science and its popularization.

The Earth, our habitat in space, should not be the least important subject of our presentations. It would seem that cosmic events have nothing to do with life on earth. The planetarium is, however, challenged to negate this apparent lack of relations. The earth, and life on it, originated under cosmic influences from the matter of former stars. It was the observation of the skies that made the division of the establishment of a of ral work. And the structure and development widened our horizon. For the scientists, space is a vast experimentation lab. In space they find states of matter that could not be created on earth. With their investigations they will solve ever new riddles of nature. Astronomy, of all sciences, confirmed that the natural laws discovered on earth are generally applicable, and it dealt the finishing blows to scholasticism and superstition.

With its captivating power, the planetarium presents a chance to shape people's conception of the world. Proceeding from astronomy, from the structure and development of the universe, the planetarium offers a global view of our world. This is a new dimension for the planetarium and adds to its effective potential, because now the presentations touch basic philosophical questions about the origin and structure of the world, the source of reason, the position of man in the universe, the sense of life, and the character of progress in human society. The fundamental concern of the planetarium and the most general demand made on it are indeed that it should reflect the world as the living space of man, both in the narrowest and the broadest possible sense of the expression. Reflection of his natural and social environment is a specific need of man, and the planetarium can, and should, satisfy it, the more so as the public is highly alert to the fundamental problems of our time.

A planetarium will be successful if it addresses its spectators in a scientifically plausible and, at the same time, emotionally appealing way. The planetarium is unique in that science and art equally contribute to the impression it makes on our minds. I am therefore inclined to call the planetarium a scientific-cultural medium. Modern planetarium shows include both scientific and artistic representations of reality; by appealing to our emotions as well as to our reason, they are apt to activate our minds in a lasting way. To employ art as a vehicle of expressing scientific contents is a legitimate method, of which planetaria are becoming increasingly aware.

Enlightenment and broadness of view in the planetarium are interdisciplinary, not only between the various sciences, but also between science and culture, or engineering and art. The planetarium is, therefore, not exclusively a vehicle of astronomy; hardly any domain of human thinking may be excluded. Many years ago, someone compared the planetarium to a powerful organ which needs a virtuoso who knows how to pull the stops in order to bring it to life. The operators of today's complex planetarium equipment, scriptwriters, graphic artists, photographers, sound engineers, electronic experts, managers and many other people involved pull all the stops in order to create a symbiosis of science, engineering, art and emotion, in which the universe, the earth and man are represented in their interaction and interdependence.

To do justice to its claim to depict our cosmic universe, the planetarium must stick to scientific methods. Will not then artistic representation be inconsistent with such methods? The apparent inconsistency is resolved if scientific methods and artistic representation complement each other.

Ever since the planetarium was invented, technicians and engineers have given priority to the principle of scientific exactitude when they designed and built planetaria. Let us look at the star field: to project it exactly, high-grade objectives are manufactured, precise positions calculated by computers, and the colors and brightnesses of stars carefully adjusted to make them look as natural as possible. The quality of star projection has continuously improved. The sky they project is righteously renowned for its naturalness, which also includes the gradual appearance of individual stars and the faint glimmer of the Milky Way at nightfall. The stars' positions, the planetary orbits, the surface details of the moon and the various scales are only a few examples of the scientific exactitude of the planetarium. The

(Please see Appeal on page 31)
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**The New Age**


James Rusk is Director of the Russell Planetarium in Mesquite Texas. This bibliography is reprinted with permission.

Reminder: the final deadline for the September issue of The Planetarian is July 21. See page 68 of the September 1989 issue (or write) for authors’ guidelines.
By Spitz, Inc., supplier of planetariums, projection domes, lighting and multimedia systems since 1945.
Today I’m going to catch up on a couple of pieces of software that have been sitting on my desk waiting for me to clear my stack.

The Floppy Almanac, by Tim S. Carroll, Nautical Almanac Office, U. S. Naval Observatory; for IBM, 256 K memory necessary; unprotected, one 5.25” disk; available from the U. S. Government Printing Office, or from Willmann-Bell for $20, for any year through 1999.

This is a computer version of the most-used parts of the Astronomical Almanac. It will calculate such things as positions (including RA/Dec, for either current epoch or epoch 2000.0; heliocentric coordinates; and barycentric coordinates), rise and set times, physical ephemerides (go look at the latest Astronomical Almanac if you’ve forgotten what those are), and the like. There is a listing of planet configurations for the current date, sidereal time for the current date, and current information about any navigational object.

The program is not fancy. You use the function keys to select items from a menu, and the results are scrolled up from the bottom. But it’s easy to use and foolproof.

The main program comes with solar system objects and 200 stars installed. If you need information about Messier objects, or a faint star from the FK4 catalog, or an extragalactic radio source, you can load in the necessary catalogs from disk. You can create your own catalogs of special objects.

Most of the options available are obvious, but there are a couple of exceptions. If you need the altitude and azimuth of an object, you need to go to the “Navigation” option. The “Rise & Set Times” option can provide you with twilight times, but you need to know which F-keys to use to get them. This is a new feature, explained in an addendum in the manual.

The Floppy Almanac is only good for a 400-day period bracketing the year of interest. You aren’t even allowed to specify a date outside this interval. In most cases, the accuracy of the program matches that of the Astronomical Ephemeris. In some cases, notably some data for the Moon, the Floppy Almanac will fall short of the accuracy of the Astronomical Ephemeris, but most such are not situations of interest to planetarians.

If you find yourself misplacing your Astronomical Ephemeris, copy The Floppy Almanac to your hard disk, and you’ll always have the information you need.

Wouldn’t it be impressive at a star party, when a satellite is spotted by some public-type person, to be able to say “Oh, yes, that’s NOAA-10, a weather satellite”? With Space Birds, you can calculate appearances of the most prominent low-orbit Earth satellites.

This program is not as user-friendly as most. For each satellite of interest, you must prepare a text file of orbital elements formatted in a precise way. You cannot do this from within the Space Birds program itself; you must use a text editor of some kind. But Mansfield does include a copy of PCWrite, a shareware text editor, that will do the job. And the files are formatted to match the NASA listings you can obtain free of charge. Mansfield even includes a form for requesting these, a very helpful feature.

But there are other files you must prepare. One text file contains information about your geographic location. Another includes information about how you want the program to run: how many days’ worth of data, which day of the year to commence, which satellite passages to display (all the night passes, only twilight passes, etc.). The formats aren’t always the clearest. For example, you must supply the starting day in terms of a count from the beginning of the year. The date March 14 must be entered as “73.” There is a conversion table in the manual, but this is not the friendliest way to talk to your computer.

To run the program, type “AVES” (“AVES87” if you have a math coprocessor). The program asks you to

(Please see Computer on page 28)
Donna Pierce, in her last "Gibbous Gazette" column, (The Planetarian, March 1990) commented on the wonderful times in which we now find ourselves, as we enter the 1990's. I would like to begin this column, by offering some of my own reflections on this concept.

First, I would definitely have to agree with Donna, that this new decade is certainly an exciting time for planetariums and the teaching of astronomy! New planetarium facilities have recently opened, or are in the planning stages in cities around the world. Existing planetariums are making use of exciting new technologies to better present their programs, and amazing new information is continuing to be collected about the universe. This enthusiasm however, should not be misinterpreted as a denial of the many problems that continue to exist in the world, and thus to have impact on us. Adverse changes in local economics, declines in contributions and government support, have forced the closing or curtailment of planetarium programs in various regions of the globe. World-wide issues such as the AIDS pandemic, racism, drug abuse, terrorism, apartheid, homelessness, famine, confront and confound all of us to find solutions, before more of our colleagues or audiences die.

Yes, it is an exciting time for those of us in the planetarium field, but it is also an extremely challenging one. One of the challenges involves our ability to communicate to audiences the inter-connections between all of us who live on this planet, the "oneness" of all the inhabitants of the Earth. This challenge calls us to be more than just bystanders in the drama of the world. We must be full active participants. As Archibald MacLeish once said, "To see the Earth as it truly is, small and blue and beautiful in that eternal silence where it floats, is to see ourselves as riders on the earth together, brothers on that bright loveliness in the eternal cold—brothers who know now they are truly brothers."

As communicators of astronomy, we have the power to help others to see the Earth as it truly is. We must use this power to communicate to them the true image of the Earth—the small, blue and beautiful oasis in the eternal cold—at the same time that we present to them the latest astronomical information.

As we consider the times in which we live, certainly there is reason for rejoicing, but let's not forget the many obstacles that continue to face us as a people, and let's make sure that we've made the personal commitment to do whatever is in our power, to work towards further progress. We are all riders on this earth together. Let's strive to be better guests on it.

Information Items:

1. The countdown to the "IPS Convention '90" is now down to the final days. Lars Broman, Convention Chair, and the Futures Museum in Borlange are taking care of the last minute preparations. Participants are packing their bags, presenters are reviewing their presentations, and everyone is looking forward to a stupendous meeting! As a reminder to those traveling from different points of the globe to the convention, don't forget to make your own local transportation arrangements to get to Borlange, from whichever airport you fly into. For those who are part of the IPS group travel plan through Sigmund Travel, a bus has been arranged to get you to the convention site from the Stockholm airport. Check with the travel agent for details. Finally, remember that everyone must make their own departure plans. Some people will leave immediately after the convention, while other will continue onto Finland for the post conference tour. In any case you must make your own plans to get to whichever airport you are using, from whichever city in which you finish your trip. See you in Sweden!

2. There have been quite a few changes in the planetarium field over the last few months. Unfortunately I may not be aware of all of them, so forgive me if I miss any (and promise to send me a note about such items if you are aware of them), but following are a few transitions worth mentioning. I would like to extend my personal best wishes and those of IPS to the following: To Paul Engle, the first President of IPS (then ISPE) on his retirement from the University of Arkansas at Little Rock (UALR) Planetarium. In honor of his service to UALR, the university has created the "Paul R. Engle Endowment Fund" for the planetarium. Anyone wishing to
contribute to the fund should write to the College of Science and Engineering Technology, University of Arkansas at Little Rock, 2801 South University, Little Rock, Arkansas 72204. Best wishes are also extended to Derrick H. Pitts on his appointment as Director of the Fels Planetarium of the Franklin Institute, Philadelphia, PA. (Derrick will also direct the new Omniverse Theater). To Bill Gutsch and the staff of the Hayden Planetarium in New York on the opening of their smash new program "Robots in Space" done in conjunction with George Lucas films. To Walter Hawley on the opening of the Christa McAuliffe planetarium in Concord New Hampshire. (The planetarium features a Digistar projector and an interactive computer system developed by SkySkan.) To the staff and director of the new planetarium in Bangalore, India. To Cary Sneider and Alan Gould of the Lawrence Hall of Science, Berkeley, CA for the excellent PASS series (Planetarium Activities for Student Success) published in conjunction with the NSF sponsored POPS II workshop. Best wishes and congratulations to one and all!

3. The various committees and task forces of IPS are still busy at work on their projects. You'll find a report on the Script Bank Committee in the "Scriptorium" column later in this issue and a brief letter from April Whitt on the IPS Committee for the Exchange of Communication and Personnel. The December 1989 issue of The Planetarian listed the chairs and coordinators for each of the IPS committees and task forces and if you have not done so already, please contact one or more of them, and volunteer your help.

4. This is a final reminder to all IPS representatives that the IPS Executive Council will hold its next session in Borlange Sweden on Sunday July 15, 1990. All members of Council, committee chairs, and project coordinators are required to present written reports to Council whether by mail or in person at the meeting. If you are an official voting member of Council and can not attend, please notify the Secretary in writing of your proxy.

5. On the topic of conferences, please note that there are two proposals for the 1994 IPS Conference. The Kendall Planetarium of the Oregon Museum of Science and Industry in Portland, Oregon, U.S.A. and the Astronaut Memorial Hall of Brevard Community College in Cocoa, Florida, U.S.A. have both formally invited IPS to hold the 1994 Conference at their facilities. The difficult decision between these two excellent choices will be made at the upcoming Council Meeting. Therefore, please let your representative know your thoughts on this subject before the meeting.

6. During this coming fall/winter television season (1990/91), a new series of programs about astronomy will air on public television in the United States. The Astronomers was produced by KCET/Los Angeles through a major grant from the W. M. Keck Foundation. The series consists of six one hour-long episodes. Each segment will deal with a different aspect of the subject including dark matter, cosmology, stars, quasars, planets, and the future. The series will tell of the men and women making headlines in space exploration—people who, in generations to come, will be looked upon as the Galileo's of the twentieth century. Planetariums should contact their local public television stations for details on the dates and times of broadcast.

7. April 9-12, 1990, NASA sponsored an "Educator's Conference" in Conjunction with the launch of the Hubble Space Telescope by STS-31. Although the launch was delayed, the conference was quite a success. Many planetariums were represented at the meeting (Bishop, Buehler, McAuliffe - Co, Brockton, Taunton, West Chester University, Methacton, etc.). During the program, Dr. Chaissen from the Space Telescope Science Institute (STSI) mentioned that a television program about the Hubble Telescope will start in September called "Stardate" and produced by Maryland Public Television. In addition, Dr. Chaissen showed a few animation film clips that were produced at the "Astronomy Visualization Laboratory" of the STSI. The clips were excellent visuals of the telescope and astronomical phenomena, and are now in the public domain. They are available by sending STSI a formal letter requesting the material along with a blank tape. The letter should specify the tape format desired. Mail to: Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, Maryland 21218, USA.

8. As the final information item, I would like to bring to your attention a wonderful old film that is in keeping with my opening comments for this column. The film was conceived and produced by David Hoffman for United Technologies Corporation and is called "Reflections." During the fifteen minutes of the movie, the film makers take the words of Astronaut Rusty Schweickart, and Archibald MacLeish edit and adapt them, and illustrate them with NASA footage from several space missions. The program stresses the oneness of all the peoples of Earth and the inner vision that can be derived from seeing our planet from space. From space, the Earth is seen without the "dotted lines" so familiar on globes and maps that separate countries and cultures. It is a very moving film and one that I highly recommend. To my knowledge, the film is available for free by sending a blank videotape with a letter of request to your local NASA Teacher Resource Center. (I sent a tape to JPL and they made a copy for me).

In closing, I wish to thank all of the people who have contributed to the growth of our profession through their work in IPS, especially those mentioned above. And to all those who are considering participation, I urge you again to join in! I look forward to gaining from your involvement!
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PLANETARIUMS

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The Hubble Space Telescope: A Bibliography

Andrew Fraknoi
Astronomical Society of the Pacific
390 Ashton Ave.,
San Francisco, CA 94112

1. Nontechnical Books


Davies, J. *Satellite Astronomy.* 1988, Ellis Horwood/John Wiley. Includes several sections on HST.


The April 1990 issue of *Sky and Telescope* is devoted to the Space Telescope.

2. Nontechnical Articles


3. Somewhat More Technical Articles


4. Audio-visual Materials

The Hubble Space Telescope Guide Star Catalog of over 18,000,000 objects is now available on two CD-ROM disks (with software) for $52.95 from the A.S.P. (Catalog Orders Dept., 390 Ashton Ave., San Francisco, CA 94112.) The Society will have slides and videotape from the Space Telescope in its next catalog.

The Davis Planetarium in Baltimore has a planetarium program on the Space Telescope project with some excellent visuals.
As I had hoped, I am not alone in exploring the intricacies of the Scriptorium. Accompanying me this time are Laura Kyro and Donna Pierce. Laura, (editor of the Book Review section) who writes and produces for the McDonnell Star Theater of the St. Louis Science Center, will take us through an ugly looking door labeled ...

Scriptwriting Pitfalls

When writing scripts, I ask myself the following questions:

1) Is that fact really theory?

Many of us tend to state astronomical information as absolute "facts" when precious little in astronomy (like any science which is subject to the scrutiny of the scientific method) can really be stated with certainty.

To avoid looking unprofessional (when more accurate information comes out the next day, or when quantum physicist in the audience drops by the console after the show to say that the script was full of bunk), some information could be prefaced with: "Current observations indicate ..."; "Many astronomers currently believe ..."; "Present evidence seems to show ..."; and like phrases. (The words "In fact, ..." tend to be casually thrown out in a show, when the statements behind those words may not be facts.)

While some of the phrasing may seem woozy, I don't think that it's bad to make it clear that astronomy is a science which is always undergoing change as new information is received.

2) Am I writing for "us" and not "them?"

Few planetarium facilities have a good handle on the exact comprehension level of their audiences. Those that have are able to write an effective script which their patrons can easily understand. But what about the rest of us?

A pitfall which some planetarium scripts display are those where it is clear that the author understood the subject matter perfectly, but couldn't quite relate it in a manner which was comprehensible to those not so knowledgeable.

Unfortunately, many planetarium scripts seem to be "reviewed" by those in (or close to) the same field (such as the director of the planetarium, the attached university academician, or staff colleagues) who may have a similar level of knowledge on the topic and therefore, a similar lack of perspective.

All authors should have a "quality control" review panel composed of those learned types mentioned earlier (to check the accuracy of the information) and a person-in-the-street type (to see if the information is understandable). After all, we're doing it for them.

3) Can it be supported visually?

There is nothing so dead in a planetarium show as a whole bunch of words without a visual to accompany and enhance them. A star-filled background can be spectacular, but when that's all the audience sees while hearing an endless discussion of something which doesn't lend itself to a visual treatment, it's a problem.

The writer should always have an appropriate visual effect in mind and drop those subjects (no matter how really interesting they are) which can't be easily supported with slides/special effects/video/etc.

4) Would it have been better as a book?

Why come to the planetarium if you could have read the same information (in the same style) at home from a book?

Some authors of scripts are just that—authors. They tend to write to be read and not to write a verbal script to be interpreted by a narrator. This can result in awkward-sounding phrasing or run-on sentences in which the narrator has to stop and take a breath in the middle (among other things).
Script writers should always read their masterpieces aloud to themselves (and/or a small audience) to make sure that it "sounds" right.

5) Is my current "style" of writing in a rut?

Many planetarium script authors seem to consider that the only proper planetarium show is straight narrative/lecture. While the single "voice of god" narrator is excellent for many purposes, other styles of show presentation (e.g., a science fiction story motif, game show format, two-narrator conversation) may be just as valid for the subject matter.

Especially in shows for school groups or children, straight lecture is sure to turn them off (it's too much like school, and this is a field trip!) and perhaps keep them from returning later.

Mix up your styles of presentation. Try to make the process of writing as fresh and as much of a pleasure for you as you hope it will be for the audience.

6) Am I writing down to the kids?

There is very little worse in a show intended for children or lower grades than when it is obviously adapted from an adult show script with the "big words" removed and the questionably difficult passages excised.

If you're writing for children, make it sound like you cared enough to try to contact them on their level.

—Contributed by Laura Kyro, St. Louis Science Center

Back in Volume 18, Number 2 (June 1989), Jeanne Bishop wrote an article about astronomical poetry called "Stars in Their Eyes; Poetry in Their Hearts." It seemed only natural that sooner or later I would come across a part of the Scriptorium called ...

Poetry in Planetarium Scripts (Some Examples)

Planetariums have been the setting for everything from chamber music concerts to stage plays to laser light shows to poetry recitals. Poetry and flowery language is one of my hobbies, so I was interested in finding out how extensively poetry was used in the planetarium show setting. After spending a considerable amount of time hunting for examples, I was only able to come up with three that I can document (I would appreciate being apprised of any others, however!). The three shows examined here illustrate what I feel to be a range of its possible uses.

1) Sky Rambles, Morehead Planetarium

In this weekly look at the sky of the season, one of our astronomy staff points out some of the noteworthy sights and upcoming events and relates appropriate seasonal constellation myths and legends in a relatively informal setting.

As the house lights fade, and the Zeiss sun prepares to set, one hears the familiar strains of Pachelbel's Canon in D. Over this is a reading of an appropriate section of the poem "Of Life Beneath the Stars" by J. David Andrews. I would normally quote some of Mr. Andrews' poem here so you can see just how effective it is, but the author has withheld permission to publish in this forum and I will respect his wishes.

In Sky Rambles, the poem serves as a mood-setting device and is not an integral part of the remainder of the show, which is done live.

2) Summer Nights 1989, St. Louis Science Center

Last year, Laura Kyro wrote a taped seasonal sky show which incorporates some of her own verses which "actually dealt with the subject matter in question." In this show, each separate section has its own poetic introduction, and usually the script harkens back to the poem to provide a framework for the in-depth information. Here are some brief segments to show how she incorporated poetry with the prose:

... The summer nights show us many constellations and asterisms, and without further ado, let's identify a few of them seen in the early summer skies.

Leo roars his regal last,
The herdsman rides the sky.
Virgo, maid with shaft of wheat
Beguiles the scorpion's eye.
Hercules and crown of light
Lead eagle, swan and lyre.
The centaur draws his starry bow
Within the path of fire.

Contained within this short poem is a mention of most of the prominent constellations in the early summer skies; that is, late June and throughout July between 8 and 10 p.m. Let's take each line one by one, and start by indicating the four major directions; east, south, west, and north.

"Leo roars his regal last" means that the constellation of Leo, the Lion, now in the west, will slip below the western horizon by late summer. Leo is a large figure of fairly bright stars with two distinct parts. Closest to the horizon is the front of the lion; a backward question mark of stars indicating his mane and heart. Regulus, meaning "heart of the lion," is the brightest star in the figure. To the east of the question mark is the squat triangle of his hind legs ... and the tip of his tail.

Our second line, "The herdsman rides the sky," refers to a constellation almost directly above us. The herdsman is known as Boötes. Pictured from the earliest times as a figure of a man, today we have a hard time connecting the visible
stars into a man-like image. So, in the process mentioned earlier, we've separated the brighter stars of Boötes and created the asterism of a kite with a short tail. The bright star at the bottom of the kite is Arcturus. You probably agree that these stars look much better as a kite, than as a man.

The line, "The centaur draws his starry bow," leads us low to the southeastern sky in early summer to find Sagittarius, the archer. The traditional picture found in the stars in this area is that of a half-man, half-horse creature called a centaur, with drawn bow and arrow. Today, few of us talk of centaurs on a daily basis, or see that figure among these stars. We've separated the eight brightest stars from this grouping and renamed them the asterism of the "teapot", with handle...lid...and spout.

Our final line, "Within the path of fire" refers to Sagittarius' position within a path of dimly glowing light which may be seen from dark viewing sites. Stretching across the eastern sky from south to north, this path is called the Milky Way, and is the combined light of billions and billions of distant stars. The sun and its nine planets are part of an island community of stars called the Milky Way galaxy. So large is the galaxy that it would take a beam of light—travelling at 186 thousand miles per second—one hundred thousand years to cross it. The Milky Way has a pinwheel shape with several curving arms of stars. ...

Just as in Sky Rambles, the poetry is used to set a mood, but it also helps to direct the flow of the show by giving the audience a clue to what the next topic of discussion is going to be. In any case, the poetry is certainly a refreshing way to hear the litany of the seasonal sky presented.

3) Once Upon a Universe, Morehead Planetarium

Unlike the other two examples, Once Upon a Universe is written entirely in verse. Because it is a show targeted for the youngest audiences, it was thought that the rhyming sounds along with cartoon-like characters would actually serve to enhance the show. Judging from the commentary so far, it seems to be hitting the mark. Here's a brief smattering of the show:

**Narrator**: Once upon a universe
Not so far away,
A young child and her uncle wise
Went out at the end of day.

The Sun was setting in the west;
The hills were all aglow.
The child looked up at the evening sky
And promptly whispered -

**Child**: Oh!
How beautiful the sky looks now,
All blue and red and yellow.
The Sun, when setting in the west,
Is quite a handsome fellow.

**Narrator**: Twilight fell upon the land
With the evening breeze to fan it,
And then the child began to shout -

**Child**: Oh my, is that a planet?
Which one is it? Oh could it be,
Say, Jupiter - or Mars?
A planet shines so steadily,
Not twinkly like the stars.

**Uncle**: That's planet Venus...

**Narrator**: (her uncle said)

**Uncle**: That you have found right there.
Its reflected light shines more steadily
Through the Earth's fat blanket of air.
It's closer, dear, to you and me
Than the stars that shine on far.
And that's why planets don't twinkle as much
As your real and truly stars.

**Narrator**: Just then a light rose in the east...

**Child**: It can't be day so soon!

**Uncle**: No, it isn’t the Sun, but a silvery orb.

**Child**: Oh! It's the beautiful Moon.

**Uncle**: The Moon has no light of its own
But reflects the light of the Sun.
Without that light, it's a big, dark rock
(And that isn't very much fun).

**Child**: The Moon doesn't always look the same
When I look for it each night.
It changes its place, and seems to change shape.
What a strange and curious sight!

**Uncle**: The Moon goes round the Earth, we know,
And moves a bit each day,
So when the Sun shines down on it
We see it a different way.

The Moon appears to change it's shape
And each new look amazes,
Full moon, quarter moon, gibbous, and new,
And these are called its phases.
The Moon lives right next door to us,  
But it’s bigger than it appears.  
If you could put it on the Earth,  
It would stretch from here to here.  
Although the Moon is Earth’s closest kin,  
It’s still far off a’ways—  
A quarter of a million miles—  
By car it’d take almost 200 days!

Child:  
But I couldn’t go to the Moon in a car,  
it’s not made for that kind of trip.  
I’d need to go in a rocket, at least,  
Or a fancy, shiny space ship!

Uncle: There are many things in the night-time world  
That set the sky a’light.  
There are comets, galaxies, and nebulae  
And supernovas bright!

Child:  
A gal-a-what? A neb-u-who?!

Narrator: Our child said with a pout.

Child: I’ll never learn all of those things,  
And what they’re all about.

Uncle: Oh, it’s not so very hard

Narrator: Her knowing uncle said.

Uncle: I’ll tell you what they’re all about  
Before you go to bed!

Child: The night sky is so beautiful  
But there’s so much I should know.  
Will I ever learn it all  
Before we have to go?

Uncle: Oh, there are many things in the universe,  
More than we can see tonight.  
But if you love the planets,  
and the Sun that shines so bright,  
If you love the starry skies  
And you try to take the time  
Then we can find all the wonders of the night  
and make them yours and mine.

Narrator: A hush fell over the twilit land  
As the child dreamt starry dreams.  
The Earth turned ’round to meet the Sun  
With its rosy sunrise beams.

Once upon a Universe,  
Sprinkled with planets and stars,  
There’s a place called Earth, with many young dreamers  
Who may someday walk on Mars.

Although it seems like a far-off dream  
Until outer space you find,  
You can practice sailing through the stars  
If you fly with wings of the mind.

Uncle: We hope you enjoyed our little trip  
Through the planetarium’s night.  
Now you can show all your family and friends  
All the wonders you find by star-light.

Once upon a universe  
The time has come to say  
The night is done, the Sun is up;  
Enjoy the brand new day!

Narrator: I hope you’ll come back another time  
And we’ll make some more star-friends.  
The story is over, the rhyming is done.  
So I guess this is...

All Say: The End.

As co-author of the script (with Carolyn M. Watson, who did the fine artwork for The Scriptorium’s masthead, by the way), I can tell you that it is really hard to come up with the words to make the concepts of astronomy rhyme while preserving their integrity. This may indeed be the reason why I had such a difficult time finding examples for the sake of this discussion. I have a new-found respect for the saga and epic writers, not to mention Dr. Seuss!

My thanks to the Morehead Planetarium for sharing Once Upon a Universe (© 1989 Morehead Planetarium) and likewise to the St. Louis Science Center for bits of Summer Nights 1989 (© 1989 St. Louis Science Center).

— T. W. H.

My other companion through the Scriptorium is none other than Donna Pierce, of Gibbous Gazette fame...

Information from the IPS Script Bank Committee

The IPS Script Bank Committee currently consists of Donna C. Pierce (Chair), Highland Park Planetarium, Texas, USA; Thomas W. Hocking, Morehead Planetarium, North Carolina, USA; and Gary E. Sampson, Wauwatosa School District Planetarium, Wisconsin, USA. It should be noted that the Chair is actively seeking interested members from other countries to assist with this endeavor.
Purpose: The IPS Script Bank serves as a repository for show scripts which are available to all members. Scripts on file should be considered only as resource material for show producers not wishing to "reinvent the wheel" when coming up with ideas for show topics. In the committee's opinion, the Script Bank is not being created to interfere with the efforts of independent program producers to produce and sell complete or partial show packages to the members of the society. It is the committee's opinion that all producers who are members of IPS should be encouraged to avail themselves of this service.

Operational Guidelines:

1) The "seeds" of the Script Bank will be the scripts submitted for judging during the Eugenides Foundation contests, but voluntary contributions will be essential to the success of this project.

2) Original authors/owners must complete and sign a non-exclusive licensing agreement form when offering materials to the IPS Script Bank. This license only covers reproduction and distribution of the submitted item. All copyrights and other rights will be retained by the author/owner. Should the author wish to grant public production or presentation rights to IPS for IPS members, a check-off option for this purpose is on the agreement form. Otherwise, such agreements must be individually negotiated between a Script Bank user and the contributor of the item in question.

3) The International Planetarium Society, Incorporated, will assume no responsibility or liability in the event of copyright ownership or royalties issues which may later arise concerning an item licensed to it.

4) As an incentive, a IPS member who contributes a script will be entitled to receive one of the scripts already in the Script Bank in exchange for their submission.

5) Normally, copies of a script may be obtained at a cost of ten US cents per page, which covers duplication fees, plus applicable postage charges.

6) The IPS Script Bank will be administered initially by Gary E. Sampson, Director of the Wauwatosa School District Planetarium.

7) Submissions should be sent to:

IPS Script Bank
Wauwatosa West High School
11400 West Center Street
Wauwatosa, WI 53222 USA

8) A catalog of available scripts will be periodically published in The Planetarian.

9) Scripts should be sent to the IPS Script Bank as hard copy with black printing on white paper.

10) A one page English-language abstract must accompany every submission. Ordering information (if the item is for sale) should be included in the abstract.

11) A separate form and abstract should accompany each item submitted. A set of curriculum guides for one show (for example) would be considered one item.

12) The submitting author/owner may have their item withdrawn from further circulation by the Script Bank at any time by making a written request to the administrator of the IPS Script Bank. The administrator will have 10 business days to cease all further circulation. Original copies will not be returned under any circumstances.

13) Comments regarding the IPS Script Bank and its operation should be directed to the Chair of the IPS Script Bank Committee, Donna C. Pierce.

—Contributed by Donna C. Pierce, Highland Park Planetarium.

For those show producers who might be looking for some more immediate sources for show ideas, step right this way ...

Directory of Regional Affiliate Script Banks (Part 1: USA)

<table>
<thead>
<tr>
<th>Affiliate</th>
<th>Coordinator</th>
</tr>
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</table>
| GLPA      | Gary E. Sampson  
Wauwatosa West High School  
11400 West Center Street  
Wauwatosa, WI 53222 |
| GPPA      | None |
| MAPS      | Alan W. Davenport  
University of Maine  
Wingate Hall  
Orono, ME 04469 |
| PPA       | c/o Lonny Baker (PPA Secretary)  
Alexander Morrison Planetarium  
California Academy of Sciences  
Golden Gate Park  
San Francisco, CA 94118 |
| RMPA      | None |
An unbiased review from a plain-spoken observer.

Planetarium show lacks

State of the Art is a biweekly look at new developments in the field of electronics.

Ever since I was about 10 years old, I have been fascinated by astronomy. Uncle Lou would take my brother Bob and me to the rooftop of his rowhouse, and we would spend hours gazing at stars and planets through homemade telescopes.

I've lived in this area all of my life, and although that gives me great access to movies, concerts, restaurants and shopping, it hasn't made for prime stargazing.

When I moved to the Pinelands area of Burlington County 12 years ago, I could see the Milky Way overhead on a clear night. However, the increasing amount of light pollution emanating from shopping centers, roadways and homes has made that beautiful sight all but invisible from my area. I know the Milky Way is still up there in the same place it's always been, but to see it clearly now I'd have to travel to a less-developed area . . . like Montana.

I used to be able to see a clear reproduction of the Milky Way at the Fels Planetarium in Philadelphia. The Fels Planetarium is the largest planetarium in this area, with its dome-shaped ceiling rising several stories above its floor. It is housed on the ground floor of the Franklin Institute, where it has been since 1933.

I still remember visiting the Fels Planetarium as a child. A huge ant-like machine would rise from the floor, and the lights in the room would begin to dim. Within seconds, the "sky" above would be filled with more stars and planets than I could ever have imagined in my Philadelphia sky.

The "ant-like" creature was actually a Zeiss Star Projector, a rotating metal device that used a large collection of optical lenses and motors to accurately simulate the appearance of the sky at night, free of the light and atmospheric pollution that surround us.

Over the years, I have continued to visit the Fels Planetarium, and it has continued to amaze me. It was a place that remained unchanged, untouched and timeless — until last year, that is.

We were sent, entirely after the fact, this article from the February 9, 1990 issue of the BURLINGTON COUNTY TIMES of Willingboro, NJ, a suburb of Philadelphia.

It was written by a journalist in the normal course of his work, without the knowledge of nor any contact with Carl Zeiss.

We welcome this unexpected opportunity to present the spontaneous, unsolicited views of an enthusiastic member of the planetarium-going public on some fundamental issues.
It was back in 1985 that I first heard about the Digistar, a new computer-driven planetarium projection system that had been installed at the Hansen Planetarium in Salt Lake City. This new system uses computer graphics to produce small but intense star images on a cathode ray tube (CRT). These “stars” are then projected onto the dome of the planetarium by a fish-eye lens that is encased in a glass housing.

Unlike the gigantic Zeiss unit, the tiny Digistar has the ability to change the positions and motion of stars to allow us to see the constellations as they appeared million of years ago or as they will appear millions of years into the future. Stars can be made to move in both space and time.

And so, after four years of waiting for a chance to visit Salt Lake City to watch the Digistar system in action, you can imagine my enthusiasm upon hearing the Fels Planetarium was about to install one of these new, state-of-the-art projectors. But I waited patiently until last month to view the new system so that my brother, who now lives in North Carolina, could go with me to see the “rooftop stars” once again.

The lights in the planetarium dimmed, and a pale, lifeless star field filled the dome. Colorful stars such as Antares and Sirius were impossible to recognize. Familiar constellations were lost in a video game-like imitation sky. I assured myself that this must be the warm-up, and that this two-dimensional, monochrome sky would soon brighten and surpass the gorgeous, colorful sky that the old Zeiss projector produced.

But technology is not always kind. The improvements never came. Things only got worse as the stars moved across the sky is a ratcheting motion. The old Zeiss was smooth. Its modern replacement produces an image so unrealistic and unconvincing that my brother’s girlfriend fell asleep during the show. If I were to rate this show as movies are rated, I’d give it only one star.

I usually conclude my column by suggesting that you go see a product or display and judge it yourself. But in this case, I suggest that you save your time and money. There are many interesting things to do and see at the Franklin Institute, but the planetarium is no longer one of them.

There are many brilliant scientists, engineers and technicians who are constantly improving the institution’s exhibits. Now they have a new toy to work on.

Jim Elliot is a free-lance writer.
Planetarium show lacks predecessor's star quality

I was back in 1985 that I first heard about the Digistar, a new computer-driven planetarium projection system that had been installed at the Hansen Planetarium in Salt Lake City. This new system uses computer graphics to produce small but intense star images on a cathode ray tube (CRT). These "stars" are then projected onto the dome of the planetarium by a fish-eye lens that is encased in a glass housing.

Unlike the gigantic Zeiss unit, the tiny Digistar has the ability to change the positions and motion of stars to allow us to see the constellations as they appeared million of years ago as well as how they will appear millions of years into the future. Stars can be made to move in both space and time. And so, after four years of waiting for a chance to visit Salt Lake City to watch the Digistar system in action, you can imagine my enthusiasm upon hearing the Fels Planetarium was about to install one of these new, state-of-the-art projectors. But I waited patiently until last month to view the new system so that my brother, who now lives in North Carolina, could go with me to see the "rooftop stars" once again.

The lights in the planetarium dimmed, and a pale, lifeless star field filled the dome. Colorful stars such as Antares and Sirius were impossible to recognize. Familiar constellations were lost in a video game-like imitation sky. I assured myself that this must be the warm-up, and that this two-dimensional, monochrome sky would soon brighten and surpass the gorgeous, colorful sky that the old Zeiss projector produced.

But technology is not always kind. The improvements never came. Things only got worse as the stars moved across the sky is a ratcheting motion. The old Zeiss was smooth. Its modern replacement produces an image so unrealistic and unconvincing that my brother's girlfriend fell asleep during the show. If I were to rate this show as movies are rated, I'd give it only one star.

I usually conclude my column by suggesting that you go see a product or display and judge it yourself. But in this case, I suggest that you save your time and money. There are many interesting things to do and see at the Franklin Institute, but the planetarium is no longer one of them. There are many brilliant scientists, engineers and technicians who are constantly improving the institution's exhibits. Now they have a new toy to work on.

Jim Elliott is a free-lance writer.

We were sent, entirely after the fact, this article from the February 8, 1990 issue of the BURLINGTON COUNTY TIMES of Willingboro, NJ, a suburb of Philadelphia.

It was written by a journalist in the normal course of his work, without the knowledge of nor any contact with Carl Zeiss.

We welcome this unexpected opportunity to present the spontaneous, unscripted views of an enthusiastic member of the planetarium-going public on some fundamental issues.

Reprinted courtesy of Burlington County Times and Jim Elliott.

Those of us inside the planetarium field, sometimes running the risk of confusing forest and trees, can profit from learning how others see us, our institutions, shows and products. We at Carl Zeiss have always considered the quality and accuracy of the night sky to be the mission of one of a planetarium. We still do.

People still come to us to see a bright, sharp sky. Let's not disappoint them.
The original theme of this meander through the Scriptorium dealt with software and hardware as part of a larger general discussion of "Writer's Tools." As you can see, we are still on a distinct software binge. Perhaps that is as it should be. You never knew though, a rip-roaring discussion of approaches to producing shows with emphasis on hardware may appear at any time ...

For now, we'll end with a short review of a Neat Book. The review needs to be short because there's an asbestos-removal team waiting to move in and make the next chunk of the Scriptorium safe for us creative types ...

A Review


Strunk and White, move over! Matt Young is here with a most inviting and readable little book that should be on the desk of anybody who is even thinking of writing about science for the public.

Dr. Young is an American physicist with two books and over 50 published journal articles under his belt. While Young doesn't claim to be The Ultimate Authority on technical writing, one does not have to read very far to figure out that this is a voice, if not the voice, of experience talking.

The book is divided into two main parts. Part I is a short narrative entitled, "An Introduction to Technical Writing," which dispenses three very useful rules for writing about science. Part II is a cross-referenced, dictionary-style section called, "An ABC of Technical Writing."

Young has let his wit creep into the entries in Part II. I don't find anything wrong with that, but the buyer should be well aware that this is not a totally dry and objective volume (nor is it purported to be one). Some entries help immensely in the presentation of papers as well as their preparation. There is even an entry on resume preparation.

Many of the entries are concise. Indeed, many are one word substitutes for archaic, evasive, or pompous terms often found in science journal articles. However, the entry for hyphen runs for nearly three pages (It's interesting reading, too!). There are also pronunciation and spelling tips laced throughout.

The Technical Writer's Handbook may not totally replace traditional style manuals, but as a quick reference it is indispensable. If you write show scripts, journal articles, grant proposals, or press releases, you need access to this book.

Keep those scripts and letters coming. While complete scripts will rarely be published here, excerpts of your scripts will be used when appropriate to the topic being discussed. My thanks to all of you who have written so far. See you after the dust settles ...

Next: "The Treatment of Females, Minorities and Aliens in Planetarium Show Scripts"; "The (Over)use of Stereotypes"; "Metric versus English: A Numbers Game"; and (I haven't forgotten!) the second installment of our Columbus quincentennial feature, "Hammering the Outline Together."

(Computer, continued from page 16)
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What's New

Jim Manning
Taylor Planetarium
Museum of the Rockies
Montana State University
Bozeman, Montana 59717

A special thank you to those who have supplied grist for the "What's New" mill these many months. Your contributions have made this column easier to manage, more varied in its topics, and fatter than it would otherwise have been.

Please let me encourage you to continue sending in your new finds, products, equipment, techniques—whatever. What you find of value, your colleagues may, too.

Touchy-Feelies from Space

I once had an astronomy professor who said that astronomers are basically voyeurs; all they can do is look. For the stuff of astronomy is mostly far away—watchable, study-able, analyze-able by robot probes, but nonetheless untouchable.

With two thankful exceptions. One is moon rocks (still pretty exclusive as far as the public is concerned, and except in rare cases, displayed firmly encased in lucite). The other exception is meteorites.

Meteorites are wonderful exhibit items, but they are even more wonderful as demonstration pieces. There's nothing quite like pulling a meteorite out of your pocket in front of a class or group—be they children or adults—and watching the looks as you let them hold a little chunk of the universe.

In the old days, meteorites weren't so easy to come by. Mostly, you had to look them for yourself, or hope that someone who did would donate them to your museum or planetarium. Not so today, for these celestial visitors have become a decidedly entrepreneurial affair. Today, you can buy them, as you can most anything else.

From what I hear, meteorites have become a booming business, but it's also made them more accessible than ever before. If you want one of your own, or have a patron willing to give a boost to your institution's collection or to get you started with one, you have a choice of dealers with whom to inquire.

Bethany Trading Company, P.O. Box 3726, New Haven, CT 06525 USA, (203) 393-3395, has a color catalog available which offers a wide variety of specimens in iron, stony-iron, stony, and tektite categories. Prices vary with type and rarity, from about 50¢ (US) per gram for Canyon Diablo irons to $50 (US) per gram for carbonaceous chondrite samples. Also offered are display stands and cases, and a selection of books on meteorites.

Robert A. Haag Meteorites, 2990 E. Michigan, P.O. Box 27527, Tucson, AZ 85726 USA, (602) 882-8804, also offers a color catalog of a similar range of specimens at very similar prices. Also available are books, slide sets of specimens pictured in the catalog, and T-shirts.

Both companies also have small, limited, and much more expensive samples of very rare carbonaceous chondrites and shergottites suspected of being, respectively, cometary and Martian in origin. Both also sell meteorite jewelry (which leaves me feeling vaguely uncomfortable; perhaps I'm a purist, but it somehow seems an inappropriate fate for space travelers to be chopped into little bits and hung on somebody's ears! My personal—if honest—opinion).

Other meteorite dealers listed in an article in the August 1989 issue of Astronomy magazine include: David New, P.O. Box 278, Anacortes, Washington 98221 USA; and Oklahoma Meteorite Laboratory, P.O. Box 1923, Stillwater, OK 74076 USA.

Meteorite enthusiast Hank Dyerle adds the following dealer names as possible sources: Cureton Mineral Company, P.O. Box 5761, Tucson, AZ 85703 USA, (602) 743-7239; Mineralogical Research Company, 15840 E. Alta Vista Way, San Jose, CA 95127 USA, (408) 923-6800; and Museum Bally-Prior, Schoenenwerd, Swiss Meteorite Laboratory, Rauchensteinstr 12, CH-5000, Aarau/Switzerland.

Those of modest means may wish to consider also Meteor Crater Enterprises, Inc., 603 North Beaver St, Suite C, Flagstaff, AZ 86001 USA, (602) 774-8350. You can write or call for a mail order form to purchase a variety of items, including photos of the crater and "meteorite oxides"—fragments of the oxidized fusion crust of the Canyon Diablo meteorite that flaked off and followed the meteorite in on its passage through the atmosphere. These small pieces cost $1 and up depending on the weight specified, and would be an inexpensive way for teachers on frugal budgets to obtain a sample of meteoritic material for classroom use.

Doubtless there are other sources of meteorites in addition to these. If you know of others, and wish to send me names and addresses, I'll add them to the list.

And when or if you consider acquiring meteorites to display and conserve securely out of reach in glass
cases, do think also about getting that “pocket” meteorite—the one you can haul out and let people touch and feel with impunity. I think it’s well worth the trouble and the wear and tear to be able to put your public in direct contact with some part of an otherwise remote universe.

The Moon Bag

April Whitt of the Adler Planetarium sends word of a new and useful educational toy for budding astronomers 7 months to 3 years old.

She writes: “It’s for young children and their parents, and is called a moon bag. It consists of a blue cloth drawstring bag with “kidgets” inside: soft stuffed cloth Sun, three phases of the Moon (crescent, quarter, and full), a cloud, and a cow (for jumping over the Moon). There’s a sheet of nursery rhymes about the moon and some suggestions for parents to use these to teach their children about words like ‘over’ and ‘around’ and, of course, the phases of the moon. The astronomy is all accurate, and well presented.”

April’s tried it out on her young daughter Carter, and already has her pointing at the moon. Having acquired a sample bag myself (these things must be play-tested!), I, too, found the bag and teaching guide to be nicely done—and colorful. It’s not easy to find science-related toddler toys; this is one to consider carrying in your gift shop.

The Moon Bag (full name: the Baby Curious Moon Bag), is put out by Questioning Minds, P. O. Box 4702, Decatur, Illinois 62525 USA, (217) 429-9423 or (217) 429-6636. It’s one of a series of Baby Curious Bags, including the Seasons Bag (also science related), and the Kitten and Foot Bags (designed to help develop counting and arithmetic skills).

Thanks for the tip, April!

Challenger Teleconferences

Last January 26, the Challenger Center broadcast an “interactive satellite teleconference” titled “Return to the Moon,” featuring learning activities and an interview with Apollo astronaut Michael Collins. It ran on satellite Telstar 301, channel 19.

If you missed it, but would like to know about future programs, you might want to get on the Center’s mailing list. Contact Michele Maduro, Program Coordinator, The Challenger Center, 1101 King Street, Suite 190, Alexandria, VA 22314 USA, (703) 683-9740.

The Center hopes to do a fall program on the Hubble Space Telescope. If you register with Ms. Maduro as a Challenger Center Distance Learning Network site, you should receive notice and can send in for a free curriculum packet to accompany the program.

Until next time—what’s new?

(Appeal, continued from page 10)

visitor can rely on the fact that the projections rigorously follow the laws of celestial mechanics and the finding of astrophysics.

Scientific correctness is also required of the texts and pictures presented, but it is not enough. Dawn in the planetarium may be either plain and prosaic or emotionally touched. A particular piece of information may be presented by a dull inscription slide or by an artistic illustration. When the narrator tells about the chemical composition of the atmosphere of Venus, why not project, at the same time, the clouds drifting across the surface? Scientific correctness of the facts presented does not imply the abandoning of artistic means for their presentation.

Scientific correctness should not be confused with realistic presentation either. Travels through the solar system, a landing on Jupiter’s moon Ganymede, passing through the rings of Saturn or the passage of a comet—these are presentations that cannot be realistic. Nor do they have to be. They are rather concentrated on what is essential, lucid or typical, or on particular features. Advanced equipment and recent knowledge make it possible to visualize these effects on a scientifically sound basis. Fancy and aesthetics have a part to play in this. Artistic presentation is, thus, not in conflict with the scientific content. The degree of artistic license depends, however, notably on the current state of scientific knowledge. The artistic effects are intended to impress, in the best sense of the word, To intensify the impression and to make it lasting, the effects frequently have to be overdone. On the other hand, effects should never be used so lavishly as to dim the informative content of the presentation. A show that aims merely at impressing the visitor fails to satisfy the general public demands placed on a planetarium.

Most planetaria operate by the principles outlined above, either consciously or spontaneously. Time is ripe for planetaria to become fully aware of these principles and to propagate the general intentions of the planetarium as a medium. Whether a planetarium still calls itself a planetarium or prefers to be termed a “Science Center”—it is, and remains, a unique, interdisciplinary facility with specific scientific and cultural features of its own.

This article originally appeared in Jena Review, and is reprinted from Seiler Projections, with permission.

The Planetarian, Vol. 19, No. 2, June 1990
INTRODUCTION

1990 marks the 100th anniversary of the death of the great Dutch artist Vincent van Gogh. During this year, there will be symposiums, books, operas, films and the largest van Gogh exhibition ever assembled, and yes even planetarium programs, all designed to celebrate this brilliant artist. To be honest however, it was just a coincidence that I happened to develop the following planetarium lesson during this auspicious year. My motivation for creating the program hinged on my personal interest in van Gogh, the support of the art teachers in my building, and a series of articles that I had collected from Sky & Telescope over the last few years, discussing the possible astronomical elements of some of his paintings. The lesson is presented here not so much as to celebrate the centennial of van Gogh's death, but to rejoice in the timelessness of his works. The beauty and power of van Gogh's paintings go far beyond the constraints of one calendar year, and therefore other planetarium directors may wish to adopt some version of this lesson for their schedules whether it is in 1990, or the many years to come.

The following planetarium lesson was developed for eighth grade students at the Arcola Intermediate School in the Methacton School District. As part of the art curriculum, students work in various media to create their own art works, but they also spend some time studying Art History. One of the artists that they examine is Vincent van Gogh and of course one of the paintings that they study is "Starry Night." "Starry Night" is perhaps the most famous night sky painting ever created. This lesson was designed to offer them a different perspective not only on the painting, but on the painter himself. This lesson would be an excellent lab activity for students in the Arts, General Science, or Astronomy classes. Depending on the level and number of students involved, the lesson could be offered as described here, or the references to "worksheets" could be eliminated and the lesson presented without use of the written materials. Students have found the program to be a captivating and thought-provoking exercise, demonstrating the inter-relatedness between the arts and the sciences. Readers are invited to try this lesson with their students and to report to me on the outcome. If you have any questions, wish to have copies of the student work-sheets, or desire to discuss the lesson further, please contact me. And finally, as always, please consider submitting some of your favorite lessons for publication in this column. (See the guidelines at the end of this article.) Thank you.

THE "STARRY NIGHTS" OF VINCENT VAN GOGH

A Planetarium Lesson by

Gerald L. Mallon, Ed.D.

Purpose: To examine some of Vincent van Gogh's "night sky" paintings, to determine if van Gogh used actual images from the night sky in his works, or whether he created purely fictional forms for his productions.

Behavioral Objectives: By the end of the lesson, the students should be able to:

1. Identify the starfield in the painting "Starry Night on the Rhone."
2. Analyze the painting "Starry Night on the Rhone" and knowing the direction of the horizon scene, and the direction of the starfield, offer an explanation for its composition.
3. Construct a plan for investigating the painting "Road with Cypress and Star" to determine if van Gogh could have been painting an actual scene from the night sky.
4. Explain the possible connection between the central image in the painting "Starry Night" and the drawing of M51 (the Whirlpool Galaxy) by Lord Rosse, as proposed by Whitney and Boime.

Materials: Slide Projectors, Slides of some of van Gogh's paintings, (in particular Starry Night, Road with Cypress and Star, and Starry Night on the Rhone),
Appropriate text/title slides, Slide of Starry Night on the Rhone with the sky portion opaqued out, Slides of Lord Rosse's drawing of M51 - the Whirlpool Galaxy, as well as slides of Lord Rosse himself (William Parsons, the Earl of Rosse) and his 72" telescope. Sun, moon and planet projectors. Worksheets, pencils, transparencies of worksheets, overhead projector.

Preparation: The planetarium should be set for approximately 43.5 degrees north latitude, corresponding to Arles, France. The initial date and time should be set for September 18, 1888 at 11 PM. The moon should be set for full moon at approximately 22h 45m of Right Ascension. A slide projector should be positioned so as to be able to project the specially prepared slide of "Starry Night on the Rhone" towards the Southwestern horizon (the "sky portion" of the slide should be opaqued thus leaving only the landscape to be projected). Be prepared to reset the position and phase of the moon, as well as the positions of the planets Mercury and Venus to April 20, 1890, (Approximate positions: moon 3h 23m, Mercury 2h 48m, and Venus 3h 01m of Right Ascension), and finally reset the position and phase of the moon for June 17, 1889 (Moon: waning gibbous, approximately 22h 20m of Right Ascension).

Procedure: Introduction: Students are welcomed to the planetarium and the purpose of the lesson is explained. Artists have always looked to the beauty of the sky for inspiration, sometimes accurately portraying on canvas what is seen by the human eye, but many times interpreting the images, and using their imagination, creating their own versions of reality. One of the most famous paintings of the night sky is "Starry Night" by the 19th century Dutch artist Vincent van Gogh. "Starry Night" has been described by historians as hallucinatory, visionary, and highly mystical, but an intriguing question remains, *does it have a basis in the reality of the night sky? Did van Gogh use actual images from the night sky in his paintings or did he create purely fictional forms in his works?* Over the last several years an art historian, Albert Boime and an astronomer, Charles Whitney, have been independently investigating this very question. They have come up with some surprising results, and today you'll have the opportunity to conduct your own investigation into this matter of reality versus imagination, as we examine three paintings of the night sky that represent some of the "Starry Nights" of Vincent van Gogh.

After this introduction to the topic, engage the class in the following activity. We will begin our examination of van Gogh's work by starting with an earlier "Starry Night." "Starry Night on the Rhone" was painted in September 1888 in Arles, France. Explain to them that to conduct the investigation today, it will be necessary to collect evidence from a variety of sources including:

The many letters that Vincent van Gogh wrote, mainly to his brother and sister. In these letters, van Gogh would often refer to the works that he had recently finished. These letters thus help to provide a method for dating the paintings. The letters also provide the reader with a glimpse of van Gogh's fascination with the sky.

The weather records for the areas where van Gogh painted (1888-1890). These records indicate the nights that were cloudy or rainy, and those that would have provided a clear view of the night sky.

A review of the maps for the areas where van Gogh painted. This information will help to pinpoint exactly where van Gogh would have stood and what could have been seen from these positions.

A planetarium simulation of the night sky for the predicted dates for van Gogh's work. This will enable us to see whether the objects painted on canvas could have been seen in the sky.

To begin, look closely at the painting. Can anyone identify the starfield represented in the picture? (Give the students a moment to work. Take student responses until someone points out the Big Dipper.) Indeed this is the group of stars called the "Big Dipper" or as van Gogh referred to them in his letters, the "Great Bear" (Ursa Major). But is this how the sky would have actually appeared at the time of the painting? You're about to find out! From van Gogh's letters we know that this painting was done during the latter half of September 1888. From weather records for the area, we know that the weather was clear from the 15th of September until the morning of the 22nd, but then it rained for four days, clearing on the 27th. Considering this, let's choose a date in the middle of the clear period, perhaps September 18th. From the position of the stars in the picture—the Big Dipper almost parallel to the ground—we can estimate that for a date towards mid-September the time would be around midnight. Using all this information, let's now set the planetarium for September 18, 1888 at midnight and look at the sky that perhaps inspired Vincent van Gogh to paint "Starry Night on the Rhone." (Bring the lights down. The stars and moon should be on.) Ask the students to look around the sky and to try to find the Big Dipper or Great Bear? (Give students a moment to look and then have a volunteer point out the starfield.) Compare the appearance of the starfield to that in the painting. It is remarkably similar although one star is slightly out of place. Can anyone find it? The astronomer Whitney theorizes that van Gogh did this intentionally. So from this examination, it would appear that van Gogh did paint a fairly accurate view of the night sky. But one puzzle remains. Does anyone know what direction you would need to be looking in order to see the Big Dipper? (north). Yet in the painting, we are looking at the southwestern horizon! (Project the horizon section from the painting towards the southwest horizon of the planetarium.) Look at the night sky, can anyone offer any thoughts on why van Gogh might have put the northern sky over the southwestern view of Arles? (Accept
student responses and try to elicit the following two points: 1) The sky towards the south did not contain any prominent stars or constellations and 2) There would have been a full moon on the 18th of the month. The light of the moon would have obstructed all but the brighter stars in the area around it. This effect would have lasted for several few days.) It would appear then that van Gogh did create an accurate view of the night sky but merged it with the horizon from a different direction. Perhaps he chose the northern sky because it was more interesting and because it was farther from the problems of the moonlight. As I bring the lights back up, write a short summary of our findings in the space on your worksheet.

For our next activity, we are going to look at another "night sky" painting by van Gogh called, "Road with Cypress and Star." Our goal is to try to identify the celestial objects in the painting, and to find out if van Gogh could have actually seen them in the sky. But this time your task is going to be a little different. Rather than my taking you through the process step-by-step, you are going to have to develop a plan for investigating the painting. The class will be divided into teams and each team will try to develop the best possible plan for investigating the painting. From our examination of the first painting, you had a chance to see some of the elements that would be necessary to conduct such an investigation, for example, it was necessary to somehow date the painting to a particular time of the year, it was important to check the weather records, etc. Your team will have to decide what evidence it wants to collect for this new painting, in what order it should be collected, and from where you could expect to get the information. Also, after you've all agreed on the evidence and recorded your plan on the space on your worksheets, then you must construct a flow chart showing the order in which the evidence should be collected. For example you can't check the weather records until you know what dates you want to check. So the order of your flow chart should reflect this. You should list the first step that you think should be taken in the top box, and then continue down using as many boxes as necessary for

your plan. When you have finished, we will compare
the plans from each of the teams and then proceed to
conduct the investigation based on the best elements
from each of the plans. (Divide the class into teams of
approximately 4 or 5 students each. Give the teams a
few minutes to work. As they are working, circulate
among them and offer assistance as may be necessary.
Collect one sample plan from each team. Read each
plan aloud and ask the class to look for similarities
between them. Create a composite plan using the best
elements from each of the team plans. The final plan
and flow chart should contain the following:

1) Determine the approximate date and the location
for the painting by checking the letters that van Gogh
wrote.

2) Determine which dates during this period would
have had a waxing crescent moon visible, using other
records or the planetarium.

3) Find out if the sky was clear on the proposed dates
by checking the weather records.

4) Using the planetarium check for any bright objects
near the moon on the proposed dates.

The above plan is basically the one that two astro-
nomers, Olson and Doescher, of Southwest Texas State
University used to analyze this painting. If we follow
this plan, we would find that: 1) Based on van Gogh's
letters, art historians have concluded that "Road with
Cypress and Star" was painted at St. Remy in Provence,
France very near the end of van Gogh's yearlong stay
there. Therefore he created the piece shortly before May
16, 1890 when he left St. Remy by train. 2) There would
have been a waxing crescent visible on May 19th or 20th
but this would have been after van Gogh left the area,
so it would have to have been the waxing crescent seen
the month before on April 20-21, 1890. 3) Meteorological
records indicate that the weather turned mediocre for a
five day period starting on April 22nd, but would have
been clear on the 20th or 21st. This now takes us to
point four, when we can check the sky for any bright
stars near the moon. We will set the planetarium for
April 20, 1890, at St. Remy France and look at the sky
near the moon for the bright stars seen in the painting.
(Bring the lights down. Turn on the moon and stars. If
possible, do not turn on the planet projectors yet. Point
out the moon and the area around it.)

Here is the sky as it would have been seen on the
night of April 20, 1890 shortly after sunset. I am project-
ing the moon and stars as they would have been seen in
St. Remy, France at that time. But the moon doesn't
appear to be near any bright stars on this night! Are
there any other objects that might appear to look like
stars when seen in the sky? (Accept the student
response of—planets.) Yes, planets would look like stars
and if we add the planets to the night sky, we find that
two planets would have been close to the moon on the
night of April 20. They are Venus and Mercury. So it
would appear as if this painting may also be a fairly rea-
listic view of the night sky. However, once again van
gogh has left us with a puzzle! Compare the grouping
of the moon and two planets in the painting, with the
arrangement of the same objects in the sky. (Project a
picture of the painting.) Does anyone see any differ-
ences? (Accept students answers—the moon is on the
other side of the planets.) Indeed, perhaps for reasons of
composition, van Gogh appears to have reversed the
images of the moon and planets. van Gogh may have
used the real sky for inspiration, but when necessary, he
changed it to suit his needs, as we will see again as we
examine one final painting.

For our final activity today, we are going to examine
the most famous of van Gogh's night sky paintings, and
perhaps the most puzzling, "Starry Night." As men-
tioned earlier, many art historians have considered it a
"mystical" and "hallucinatory" piece. The astronomer
Whitney described the painting as follows: "A crescent
moon and a scattering of stars hang over a village, and a
swirling pattern reaches across the sky. In the fore-
ground stands a tree, like a black flame, and in the back-
ground we see a vague outline of hills rolling up toward
the right." Certainly imagination, realism and mysticism
all played complex roles in van Gogh's paint-
ings. But could there be some astronomical basis for this
painting as well? Let's begin our investigation into this
question, as we did with the previous two paintings, by
determining the approximate date of its creation. From
letters that van Gogh wrote to his sister on June 16, 1889
and his brother on June 17 or 18, 1889, it can be con-
cluded that the painting was completed sometime
between June 16-18, 1889. Weather records for the area
indicate that clouds and rain filled the sky a few days
before and after this interval, but fairly clear skies were
in evidence from June 15-18, 1889. So far, this is in keep-
ing with our investigation of an astronomical basis for
the painting. van Gogh would have had clear weather
at the time that the painting was completed, so let's now
set the planetarium sky for the night of June 17, 1889
and see what the sky would have revealed to him at
that time. (Bring down the lights. Turn on the moon and
stars.) Can anyone point out a problem with the moon
as seen at this time, and as pictured in the painting?
(Student response: The moon in the sky is gibbous but
the one that van Gogh created in the painting is a cres-
cent.) There are a few other problems of which you
should be aware, as well. In the center of the picture
there is a church steeple, and to the right rolling hills
are shown, but the church, although it did exist, would
have been seen to the north from van Gogh's window,
and the hills to the south and east. We can see therefore,
that van Gogh obviously altered the position of some
earth-bound objects to suit his ideas for composition.
Keep this in mind as we examine the rest of the paint-
ing. Next, let's examine the bright object close to the
horizon and just to the right of the cypress tree. This
appears to be an extremely bright star, but another pos-
sibility would be a planet. The planet Venus would
have been seen as a "Morning Star" on this date rising
before dawn. But would van Gogh been aware of this?
Indeed he was aware, as evidenced by a letter that he
wrote to his brother Theo. "This morning I saw the country from my window a long time before sunrise, with nothing but the morning star, which looked very big." So the bright object in the painting may actually be representative of the planet Venus. But what of the swirling pattern seen in the sky above the horizon? According to the astronomer Whitney, this is probably meant to represent the Milky Way. (Turn down lights all the way until the Milky Way is visible.) As your eyes adjust to the darkness, you will see for yourself that the Milky Way would have been seen low in the east during the evening, rising high in the sky before dawn. We know that van Gogh was knowledgeable about this stream of light and had mentioned the "blue whiteness of the Milky Way" in a letter to his brother. But why did van Gogh paint the Milky Way as a swirl, rather than as a band of light? Both Boime and Whitney think that perhaps the inspiration may be a famous drawing of a spiral galaxy that was done a few decades before by William Parsons, the Earl of Rosse. Lord Rosse was an accomplished astronomer, and with his 72" telescope, drew one of the first detailed renderings of the Whirlpool Galaxy also called M51. This was before the use of photography in astronomy, and was a very famous drawing at the time. Copies of it appeared in books and magazines around the world. If you look at the drawing, you will see a striking resemblance to the central image in van Gogh's painting. So according to Whitney, "all of the elements of the sky in "Starry Night" were on view through van Gogh's window at one time or another that spring. They were not all in view at the same time, but we merely need to give up the notion that he painted the scene as a snapshot. I think he assembled his own sky from impressions gathered over an interval of a month or so. ... I conclude that "Starry Night" is a celestial composite constructed to make an image of the morning sky, perhaps for its connotation of rebirth."

In conclusion, it would seem that upon close examination, it is possible to find actual references to celestial objects in van Gogh's "Starry Night" paintings. In some cases the images have been rearranged or blended together by the artist but nevertheless they have a basis in reality. To solidify these thoughts in your mind, tonight for homework you should complete the final page in the worksheet packet. This page asks you to consider the images that we just saw in the "Starry Night" painting, and to explain the problems and/or possible explanations for some of them.

Finally, it would not be appropriate to close this program if we did not take a moment to reflect on the importance and affection that van Gogh placed on the stars. This is evidenced by his own words. Many of van Gogh's letters contained references to the beauty and mystery of the universe but perhaps none is more poignant than the following quote. Some two years before his suicide by gunshot in 1890, van Gogh had written the following to his brother,

"looking at stars always makes me dream, as simply as I dream over black dots representing town and villages on a map. Why I ask myself, shouldn't the shiny dots of the sky be as accessible as the black dots on the map of France? Just as we take a train to reach Tarascon or Rouen, we take death to reach a star."

Vincent van Gogh took that final trip on July 29, 1890 but he has left behind a legacy for all the world to cherish.

Further Reading


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**A CALL FOR LESSONS**

Readers are asked to please share their lesson plans for the secondary level (grades 7-12). New submissions will permit the continuation of this column. In submitting lesson plans, please try to use the following format: Title, Purpose, Objectives, Materials, Preparation, and Procedure. (If you have a question about this request, please contact me. Thank you!)

Send materials to:

Dr. Gerald L. Mallon
Arcola Intermediate School
Eagleville Road, RFD #1
Norristown, PA 19403 USA
Phone: 215/631-9403
Mother Earth Must Be Pleased:

Or at least a little happier. The 20th Anniversary of Earth Day last April appeared to be more acceptable to the general public than in previous years. Numerous Earth Day festivities were celebrated throughout our country and just maybe we earthlings are beginning to understand that our inheritance just might require some commitment on our part. I see a faint glimmer of hope and feel encouraged that these commitments will help to save our precious planet. I feel we planetarians should shoulder the leadership in these endeavors! By providing this leadership for changes in our collective behavior and thinking we just might forestall the horrendous prospect of an ecological collapse.

Who's On First?

Derrick H. Pitts is the new Director of Sales at the Fels Planetarium in Philadelphia. Derrick has twelve years with the Franklin Institute Science Museum. ..... Eileen M. Starr, past director of the George Stahl Planetarium at Eastern Washington University, is pursuing her doctorate in science education. ..... Just call her (Kris McCall, that is) Director of the Sudekum Planetarium of the Cumberland Science Museum! Planetarium Educator Richard H. Shores credits Kris with "the drive, energy and creativity to make things happen"! ..... John O. Williams (Astral Projections) in August will become the new Assistant Professor in the Department of Physics and Astronomy at the University of Arkansas at Little Rock. John has the task of filling the shoes of retired Professor Paul R. Engle—no small task (information on Engle's retirement celebration follows). John's SCI-FI RADIO series is presently heard on 108 radio stations! ..... for the Planetarium Technical Director, Bishop Planetarium. ..... for Buehler Planetarium Internship position. ..... for the Astronomy Education Coordinator, H.C. Kendall Planetarium, Oregon Museum of Science and Industry. ..... for a Director of the Hopkins Planetarium at the Science Museum of Western Virginia in Roanoke. ..... for a Planetarium Astronomer, The Roberson Center for the Arts and Sciences in Binghamton, New York. ..... a visiting position for 1990-91 at Nebraska Wesleyan University, Lincoln, Nebraska.

PROFESSOR PAUL R. ENGLE RETIRES:

The Mid-South Astronomical Research Society in conjunction with the University of Arkansas at Little Rock featured Paul R. Engle, (UALR), re-cap his exciting and distinguished career in astronomy and aviation at their NATIONAL ASTRONOMY DAY PUBLIC STAR PARTY April 28 at the Pinnacle Mountain State Park. The following night a RECEPTION/LASER LIGHT SHOW SPECTACULAR at the UALR Planetarium was enjoyed by Paul's many friends. Proceeds from all the events went to the PAUL R. ENGLE ENDOWMENT FUND for the Planetarium. (see REGIONAL ROUND-UP, Southwestern Association of Planetariums, in this issue). Many of you know Paul as IPS's first President from 1970 to 1972, and as a friend and colleague we all wish him much success in his retirement this month. Paul's career has span 15 years as Planetarium Director and faculty member of the department of Physics and Astronomy at UALR; one of S.W.A.P.'s most active members; over 40 years in the teaching profession at New Mexico State University, the University of Texas, Pan American, and UALR. But, did you know he was a flight commander and instructor for the United States and the Royal Air Force in the 40's; an American Airline's pilot; and an officer in the Civil Air Patrol?

The PAUL R. ENGLE ENDOWMENT FUND FOR THE PLANETARIUM as been created in recognition of Paul's distinguished career and proceeds from the Fund will be used to support the educational and public service activities of the UALR Planetarium. Gifts may be sent to the Engle Endowment Fund, UALR Planetarium, 2801 S. University, Little Rock, AR 72204-9989.

"Yes, We Do Care":

Dr. Dale E. Etheridge, Executive Manager, Clark County Community College, writes: Yes, we can read. Yes, we do care. No, we will not give you a break. I wish you would have checked your facts and contacted us about the star dedication program before you wrote your disparaging comments in the March, issue of The Planetarian. Dale goes on to give me a little of the history of the program and how it is conducted. "We recognized that there were many people in our community (the ones inquiring about the National Sky Registry) that were looking for an unusual, astronomically related gift that they could give. After very careful consideration as to what would be reasonable and appropriate, we decided to stimulate giving a gift membership in The Friends of The Planetarium by offering (for a $30 donation instead of the normal $20 membership) a certificate stating the dedication (not the naming) of a prominent star. As an additional incentive, we include AstroMedia's The Star Book." The program stimulates interest in astronomy, involvement with The Planetarium and additional income. We are up front with our patrons as to what they are getting for their money and do nothing to mislead them as to the nature, or signifi-
cance, of what it is they are getting. I believe that what we are doing does fit in with the general guide lines established by IPS concerning misleading activities."

You are right, Dale, and I stand corrected. There defi­ nitely is a difference between dedicating a star versus naming a star for someone. I hope you will accept my heartfelt apology. Also, I was so impressed with your Journal of the Universe on Orbit that I am mailing my subscription in today! Keep up the good work.

Kudos:

To the Don Harrington Discovery Center in Amarillo! The Discovery Center will begin construction on a new 20,000 square foot wing adjoining the present facility. The addition will triple the size of the existing science/ technology center and planetarium reports Steven Zavalney. The Discovery Center serves the Panhandle of Texas (my old stomping grounds) and has seen a dra­ matic growth in popularity for the 14-year-old science center. Three new permanent exhibit areas are planned: Exploration Gallery, Kidscovery, and Constructures. Director Jack N. McKinney reports 'Dinosaurs!' drew over 63,000 people to the Center during a five-month period and the new wing will accommodate over 500 compared to the 150 visitors received now. Completion of the new wing is scheduled for December!

Solar Eclipse '91:

Michael E. Chauvin reports "Eclipse of '91 could fund a planetarium on Big Island." In an open letter to the Mayor and people of Hawaii County Michael recommends that the eclipse of July 11, 1991, be used as a means of generating revenue for the construction of a public planetarium on the Island of Hawaii. "At 7:30 a.m., on the otherwise quiet morning of July 11, 1991, the island of Hawaii will be engulfed by the Moon's shadow, and people there will experience a total eclipse of the Sun, perhaps the only eclipse of this kind observed in Hawaii since the beginning of its brief recorded history." Michael goes on to suggest that the planetarium be located on the Island of Hawaii since the only other planetarium is on the Island of Oahu. His 8- point plan includes an ad hoc hotel surcharge; a sur­ charge for all tickets on all interisland flights bound for the island of Hawaii during the eclipse period; an appropriate surcharge, tax, or "user's" fee on all rental cars; a toll for the use of Saddle Road; the publication and sale of an official astronomical ephemeris for the event; large-scale, organized, outdoor entertainment in the form of a "Sunshine Festival;" coordination of other events; and the preparation and sale of videos and other mementos. Now that's a fun fundraising campaign! With Hawaii's rich astronomical heritage Michael asks: "and what better place to teach...to metaphorically bring the heavens down to Earth, than in the exciting environment of a modern planetarium?" Go for it!

The Texas Astronomical Society of Dallas filled their trip to Baja, California, with local members. Their departure for Eclipse '91 will be from Dallas on July 9th returning the 14th.

An Amazonian Solar Eclipse Expedition to Brazil is planning a departing date from Los Angeles on July 5, 1991! This group, under the direction of Bill Matthias (5236 "A" Cleon Avenue, North Hollywood, CA 91601), plans on viewing the eclipse from the remote village of Tefe, a city virtually untouched by tourism deep in the Amazonian jungle! Our very own John Mosley (Griffith Observatory) will be a tour leader, having also been one for the trip to see Halley's Comet in Brazil in '86. The last total eclipse of the sun visible from the Americas during this century occurs on July 11, 1991 and the brochure advises: "only if you are situated on a very narrow path that runs from Hawaii, across Mexico, and into South American will you see the eclipse, one of nature's grandest spectacles."

Bishop Museum Planetarium offers colleagues in the planetarium and museum fields prefer status in obtaining some of the last available eclipse tour packages. For information contact Ken Miller, Bishop Museum Planetarium, 1525 Bernice Street, P.O. Box 19000-A, Honolulu, Hawaii 96817. (The Plains Planeteria, Vol. 17, No. 1)

Brazil, Hawaii and Mexico are represented above—do send information on others—what a selection!

Oh O Say Can You See/Hear:

The Hyatt Regency Maui in Hawaii houses a prototype telescope with a computer programmed to locate and identify planets, star clusters, nebulae and galaxies atop its nine-story Lahaina Tower. The hotel says viewing began last January and has become so popular that people have been turned away! The rooftop telescope has stereo eyepieces that remain stationary no matter where the telescope is trained and a pneumatic chair that can be raised and lowered. Reservations for private sessions on the telescope are available. (The Plains Planeteria, Vol. 17, No.1).

Geoffrey R. Chester, Smithsonian Institution (Albert Einstein Planetarium), hauls an observatory around in the trunk of a compact car in the Washington area on work-days. He makes himself available to local park authorities at public stargazing programs and estimates over 5,000 people have looked through his telescopes in the past several years. "While he enjoys star-hopping with others around the universe, he admits to a hidden agenda—calling people's attention to light pollution, which leaves only the countryside dark enough to view the sky." (Smithsonian's Air & Space April/May 1990)

Radio Astronomy at the Pink Palace, reports Kathey J. Nix, (Associate Planetarium Director), has been very successful with their new telescope with readings from sunspots, solar flares and even the Milky Way Galaxy! If you have any questions about the telescope feel free to contact either George Brown or Alex Banet or follow the following directions: 24-element collinear antenna connected to the 135 Mhz Yaesu FRG 6000 receiver
which is connected to the Tono VHF 2M-190G All Mode Linear Preamplifier which is connected to the Realistic Weatheradio Timeuse which is connected to the Industrial Scientific, Inc. Omniscrite Chart Recorder which is connected to the Astron RS-35M power supply which is connected to the Pre-amp and two Mocronta 7-day Programmable Timers hooked to electrical outlets. (The S.W.A.P. Newsletter, Vol XIV, No. 1). That sure beats the leg bone connected to the thigh bone connected to .....!

For more information and assistance in choosing a telescope, contact one of our telescope experts at ..... We've got help! My thanks to John G. Wharton, St. Louis Science Center, for bringing to my attention the National Camera Exchange's "Telescope Buying Guide 1990". To quote John: I wouldn't so much mind you representing your sales staff as "telescope experts" if the advice given to all prospective buyers was sound and fair. But, when you suggest that novices consider the instruments you list under "Beginning Telescopes," you stretch credibility—and ethics—to the breaking point. He goes on: Quite simply, a beginner has no business starting with such equatorially-mounted instruments as a 4.5" Newtonian, or even a 2.4" refractor with clock drive. And, to suggest an 8"—or even 4"—catadioptric for a beginner is ludicrous! Even the alt-azimuth "budget" models you suggest are far stretches for the expertise of some neophytes, where the best start would be a pair of tripod-mounted 10 x 50 to 20 x 80 binoculars with a good beginning guide (such as Golden Books' Skyguide). Indeed, you might find that actively pushing binoculars for beginners provides you with surprisingly high sales as well as a new marketing niche.

Way to go, John! I thank you for taking the time to inform the National Camera Exchange thoughts that, I feel certain, are shared by so many of the IPS membership. A 1990 Castigation to the National Camera Exchange "Telescope Buying Guide 1990."

A Few Good Men:

The loss of Dr. Gilbert Lueninghoener last February. Dr. Lueninghoener was associated with Midland Lutheran College, Fremont, Nebraska, for nearly 70 years as an astronomy and geology instructor and planetarium director. A long time member of IPS, RMPA, and GFP Dr. Lueninghoener was instrumental in the planning of Mueller Planetarium at the University of Nebraska, the Tiel Sanford Planetarium in Cherokee, Iowa, and the Lueninghoener Planetarium at Midland. He was also an advisor to most of the planetariums constructed in the Nebraska area during the '50s, '60s, and '70s. "Dr. Lueninghoener's legacy lives. It lives in the planetarium named after him by alumni BEFORE he retired. It lives in the design of the campus observatory. It lives in the lives of those of use who were his students. It lives in the lives of all of us who were privileged to know him." (The Plains Planetaria, Vol 17, No. 1)

James Stokley passed away last December in La Jolla at the age of 89. Stokley wrote for Science News from 1926 to 1977. He was the director of the Fels Planetarium in Philadelphia and then the Buhl Planetarium in Pittsburgh before working for General Electric Research Laboratory as a publicist. Stokley joined the journalism faculty at Michigan State University in 1956 and later received a second appointment in the astronomy department. He retired in 1969.

Did You Know:

Our IPS President's new address is: Terence Murtagh, SkySkan, 500 Chesham House, 150 Regent Street, London W1R2, England. .....SWAP's Conference host Bow Walker and new bride Carolyn welcomed SWAP members to beautiful Tyler this month. .....four feet of snow in his own drive-way kept RMPA's Mickey Schmidt from driving to work at the U.S. Air Force Academy Planetarium last winter. .....The Chabot Observatory and Science Center has officially become a joint project of the City of Oakland, East Bay Regional Parks, and the Oakland Public Schools to relocate to a more earthquake safe and darker area in Joaquin Miller Regional Park! The plan is to move 20" and 8" refractors and to build a new planetarium. Larry Toy at Chabot has been named to the Board of Directors, joining astronomer Harold Weaver and eleven others. The Amateur East Bay Astronomical Society has been a motivating force along with the long time director Kingsley Wightman. .....Carolyn Collins Petersen is involved with The New Science Group (marketing teachers, is being pursued to run for IPS President, and has been spotted driving around with personalized license plates M A H Z! .....Sharon K. Parker says to contact her at SpaceQuest Planetarium at The Children's Museum of Indianapolis for information on GLPA's 26th Annual Conference to be held October 10 to 13, 1990. .....Loch Ness Productions is undergoing remodeling and Mark C. Petersen gave me the good news of WS2000+ going to 3.5! .....Barbara Baber, Morgan Jones Planetarium, Abilene, is paying for her IPS trip to Sweden with DIG and STAR (workshops for Region 14 Education Service Center). p.s.: DIG stand for Delve Into Geology. .....This month SEPA held their Conference at the Hummel Planetarium on the campus at Eastern Kentucky University in Richmond reports host Jack Fletcher. .....Congratulation to John L. Cotton, Jr., (Science Place 2 Planetarium) on receiving his MS in Engineering Management from S.M.U. last May! .....that the Arthur Barton Memorial Award is dedicated to Arthur Barton, Assistant Director of the Planetarium at the Alamosordo Space Center, who died in September of '88, is open to only planetarians who brought new ideas, inventions and contributions to the European Planetarium field. Gerhardt Rohner, Galaxy Art Productions, reports that at the time the message of his death reached them, they were just in the establishment of their company and also working on the European

(See Gibbons on page 48)
Lonny Baker  
Morrison Planetarium  
California Academy of Sciences  
Golden Gate Park  
San Francisco, California 94118

Special Programs for Special People

To prepare this issue of FORUM, I contacted a number of people who are providing special assistance and/or programming for all the special people who attend their planetaria. Special thanks to all the dedicated people who responded to the following question; I hope their work will inspire others to seek out and have greater contact with these special-needs visitors.

What kind of special programming is being done in your planetarium for special people? How are you addressing the needs of the visually and hearing impaired? What special efforts are made on behalf of emotionally handicapped or learning disabled visitors?

I wish to extend my thanks to John Mosley and Kris McCall who suggested a number of planetarians to contact. I invite anyone with creative ideas to submit them for publication in the next issue. Please submit by 1 July 1990.

*****

The Albert Einstein Planetarium has currently confined its special programming efforts to providing foreign language translations of its public shows. Once the English version soundtrack of the show is completed, timed copies of the script are sent out to French, German, Japanese and Spanish translators recommended by those countries' embassies. After the translations are independently checked for accuracy, they are recorded and edited to match the English version so there is a one to one correspondence with the visuals taking place on the dome.

The finished foreign language narrations are then put onto individual tracks of a secondary 8-track tape deck; this deck is slaved via SMPTE time code to the primary 8-track deck playing back the show's music, sound effects and English narration. The foreign language tracks are fed to a row of rear wall-mounted, hard-wired headset stations. Visitors can select which language they want to listen to (by rotary switch), and at what level (standard volume pot) via Walkman-style headphones distributed from the planetarium control console on request.

When the Albert Einstein Planetarium opened in 1976, we used an FM broadcast system for the same purpose, but it proved to be very cumbersome to maintain. Visitors could request a small battery-powered receiver that sat on their laps. Audio was delivered by pneumatic headphones like those on airlines, with the added difference that each pair had sanitary ear tips that had to be replaced after each use. I'm sure there must be a bushel or two of those replacement ear tips still stashed somewhere around the Museum.

Designed and installed by NASM's audio-visual technicians, the hard-wired system has been far easier to operate and maintain. And, we don't have to keep replacing an odd-sized battery in each of the receivers all the time.

Tom Callen, Program Resource Manager  
Albert Einstein Planetarium  
National Air and Space Museum  
Washington, DC

*****

We consider our star theater to be several theaters under one dome, since we target a variety of programs for a variety of audiences. We offer feature shows for the general public, school programs, preschool shows, and family shows. Of course, there's another classification of programs, which we creatively think of as "other." It includes laser shows, live satellite link-ups for events such as the Voyager/Neptune encounter, plays, concerts, magic shows, one-of-a-kind industrial promotions, weddings, and—well—"others." We've yet to produce a funeral, but just imagine ... the casket disappearing on the descending elevator, a puff of theatrical smoke, and ...

Your request for my response to this FORUM topic raises some guilty twinges.

We send our promotional mailings to as many organizations as possible, including those agencies dealing with special audiences, in order to encourage attendance by those special visitors. We encourage organizations which work with the physically or emotionally handicapped, and with the learning disabled, to bring their clients to any of the wide diversity of programming we offer, and we are available to suggest which programs are most appropriate for which groups. In a sense, we take the approach of mainstreaming, rather than isolating, special visitors, although we schedule
special performances for these groups on request. We also schedule, when requested, special pre-show orientation sessions for both handicapped and advantaged audiences.

Shortly after we opened our doors in 1968, we received an award for handicapped accessibility from the Organization for Accessible Buildings. The only area of our building not accessible to visitors in wheelchairs is our observatory, which is reached via a sixty-step climb. Wide aisles in the star theater make seating visitors in wheelchairs relatively simple, and advance seating is available for groups with special needs.

The majority of our programming for special audiences has been for the hearing impaired. Rochester has a large and diverse hearing-impaired community, due to the presence of the Rochester School for the Deaf (elementary through high school) and the National Technical Institute for the Deaf (NTID, a college). We occasionally present captioned performances of our feature shows for that community, but we’ve learned over the years not to schedule such a show until we receive a request to do so. When it’s been our idea, attendance has been awful.

Captioning has been done for us by professionals at NTID, since the use of language by the deaf can be different from what the hearing world might expect. We Kodak slides from the typed captions, and project them with a dissolve unit. We also keep a red-gelled lamp at the control console in the star theater, instantly available for the use of signers, and we get requests for it frequently. In the works right now is a deaf poetry show, with video projection of an actor/signer an integral part of the program.

Now that all that’s said … Special audiences are too often isolated from the larger society. Almost by definition, they require special outreach, and we don’t do enough of that. Your request for my response to this FORUM topic raises some guilty twinges. Thank you—I’ll try to let guilt stimulate action.

Francis C. Biddy  
Producer/Astronomer  
Strasenburgh Planetarium  
Rochester, New York

****

If you are thinking of a special program for any kind of handicapped people, you must be aware that you are dealing with a minority, which means there is almost no chance to fill a dome with 300 seats or so. My experiences with classes of hearing impaired and deaf people is that they come in groups of 15 to 40, and their travel budget is too small to visit the planetarium more than once per year. So, whatever you are doing, you will make it for a few people with certain needs, who come only on relatively rare occasions. However, making a program which serves their special need is not only an educational challenge, but also a social task.

Before we started a show for deaf and hearing impaired people at the Bochum Planetarium in 1981, we found out that only a few planetaria in our neighborhood had a real working concept for this purpose. If there were special presentations for a deaf audience, it was some kind of live lecture with a sign language interpreter standing in front of them. After some experiments in our dome, we considered a sign language interpretation during the show as less desirable. Although as weak as possible, the illumination onto the interpreter always produces scattered light on the dome. Furthermore, the audience frequently has to look from the interpreter (somewhere below the horizon) up to the sky where the action is. Finally, most sign language interpreters are not familiar with celestial phenomena, so that the presentation doesn’t flow as smoothly and the hearing enabled may become bored by long breaks. More professional solutions had to be found.

Thanks to Gail Boulog of the Russiaville High School Planetarium, Indiana, and GLPA Script Library, I could obtain very valuable information on planetarium programming for the deaf. The scripts and documentation written by Charles Ferguson and Kathryn Boord of the Akima Planetarium, Knoxville, Tennessee, are especially worth mentioning.

We decided to produce a 50-minute taped program with narration and music like in normal shows, and projected brief captions on the dome. The captions appear just where the points of interest are in the sky. In addition, the arrow pointer is used to bring attention to details. Since the captions are considerably shorter than the narrated text on tape, there is ample time to read them while the more redundant text is spoken. All in all we used 109 captions plus the usual slides in the show.

Prior to their visit, the groups are supplied with some printed material, including the script, a list of captions, basic information on the cosmic distance scale, constellations, and recommended introductory literature.

Prior to their visit, the groups are supplied with some printed material, including the script, a list of captions, basic information on the cosmic distance scale, constellations, and recommended introductory literature.

After the show we have reserved some 20 minutes for discussion with the audience. This is very important because it gives us feedback on our presentation. Patience is sometimes necessary to understand the speech of the deaf because they have arduously learned to speak without being able to hear what they say. Many deaf and hearing impaired make use of lip reading. So, when communicating with them, speak slowly in simply structured and well pronounced sentences.
Always keep in mind that these people are handicapped, but not dull. They are living in a world of silence or diffuse sounds, and many things which we "normal" people can immediately understand just by listening must be extensively explained to them.

An automation system, at least for the slide projectors, can be of great help for this kind of show. However, when we started in 1981, there was no computer control in our planetarium, and it worked fine, nevertheless. The operator had to keep in mind when to fade and advance the different projectors. It's just a matter of training! The enthusiastic reaction of the deaf people really was worth the effort of preparation and production!

As far as other disabled visitors are concerned, we have no special shows. Visually impaired people are a problem since the planetarium is a very visual medium. However, the planetarium does have one advantage over the real sky—the Zeiss stars are brighter than those outside!

Uwe Lemmer
Bochum Planetarium
Ruhr-Universitat Bochum
Bochum, West Germany

Editor's note: Subsequent to receiving the above letter, the following note arrived:

While working at the Akima Planetarium in Knoxville, Tennessee, I was involved in a 1979-80 grant to produce and distribute several planetarium shows designed specifically for the hearing impaired. The state school for the deaf is located in Knoxville, and groups from the school would occasionally visit the museum and planetarium. Hence, we were able to identify a greater need to program for a specific handicapped audience than most other planetariums would have. A grant application was the result. Four original shows and a kit to adapt Hansen's "The Legacy" were produced and distributed to over 100 planetariums before the grant period ended. Also, earphones were installed in three seats to accommodate hearing restricted visitors at our regular and school shows.

Charles R. Ferguson
Bays Mountain Park
Kingsport, Tennessee

Our planetarium is situated in a school corporation with about 2200 students K-12. Our school cooperates with several area schools to provide education for special students. Housed at our school are moderately and mildly mentally handicapped, learning disabled, and severely emotionally handicapped students, while hearing impaired, multiple physically handicapped, autistic, and severely handicapped students are taught at another school corporation.

Most of our planetarium programming over the years has been to meet the educational needs of the students in our school system, so all of our special education students at the elementary, middle school, and high school levels make at least two or three visits to the planetarium each year.

In preparation for special education classes, I have found it helpful to meet with the teachers of the classes that will be visiting the planetarium, especially if the teachers are experienced planetarium visitors and know what to expect. Working together we can tailor lessons that will be relevant to their needs.

Many special education students do not deal well with changes or unusual events in their daily routine, and we do not want a visit to the planetarium to be too disruptive of their regular routine. One advantage I enjoy with our special students is that I see many of them around the school on a daily basis and they know who I am, so a visit to the planetarium is not that big a deal. Every special education class in our corporation can just walk down the hall to the planetarium.

Because their classes tend to be smaller than most other classes, I try to conduct the lessons with more personal interaction. By giving live lessons as opposed to taped shows, I can be more responsive to their feedback, go slower or faster as needed, and provide immediate response to their questions. This also allows me to reinforce ideas and concepts in a variety of ways. I try to use lots of models to emphasize shapes, positions, distances, and motions. Allowing students to touch, feel, move the models and help whenever possible is also helpful.

I have also had success with taped shows, especially if I have a chance to meet with the students in their classroom, talk with them about concepts that will be discussed in the show, and maybe show some of the visuals that they will see during the show.

The students from the deaf school who come to the planetarium are able to see an interpreter who is dimly lit by a small lamp under the front cove. The process of giving a lesson for the deaf is a little slower because while the interpreter signs, the visuals or events cannot be demonstrated or shown on the dome. It doesn't work well to do both at the same time! While the students are looking at the dome, I often use Kodalith captions for further identification or explanation. The lamp for the interpreter is turned off or dimmed while the students are looking overhead, then brightened slightly when the interpreter signs.

I think it is important to provide opportunities for special students in the planetarium whenever possible. Sensitivity to their needs and a little imagination will go a long way toward providing a meaningful experience.

David E. Parker, Director
Tipton Planetarium
Tipton, Indiana

Our planetarium is situated in a school corporation with about 2200 students K-12. Our school cooperates with several area schools to provide education for special students. Housed at our school are moderately and mildly mentally handicapped, learning disabled, and severely emotionally handicapped students, while hearing impaired, multiple physically handicapped, autistic, and severely handicapped students are taught at another school corporation.

Most of our planetarium programming over the years has been to meet the educational needs of the students in our school system, so all of our special education students at the elementary, middle school, and high school levels make at least two or three visits to the planetarium each year.

In preparation for special education classes, I have found it helpful to meet with the teachers of the classes that will be visiting the planetarium, especially if the teachers are experienced planetarium visitors and know what to expect. Working together we can tailor lessons that will be relevant to their needs.

Many special education students do not deal well with changes or unusual events in their daily routine, and we do not want a visit to the planetarium to be too disruptive of their regular routine. One advantage I enjoy with our special students is that I see many of them around the school on a daily basis and they know who I am, so a visit to the planetarium is not that big a deal. Every special education class in our corporation can just walk down the hall to the planetarium.

Because their classes tend to be smaller than most other classes, I try to conduct the lessons with more personal interaction. By giving live lessons as opposed to taped shows, I can be more responsive to their feedback, go slower or faster as needed, and provide immediate response to their questions. This also allows me to reinforce ideas and concepts in a variety of ways. I try to use lots of models to emphasize shapes, positions, distances, and motions. Allowing students to touch, feel, move the models and help whenever possible is also helpful.

I have also had success with taped shows, especially if I have a chance to meet with the students in their classroom, talk with them about concepts that will be discussed in the show, and maybe show some of the visuals that they will see during the show.

The students from the deaf school who come to the planetarium are able to see an interpreter who is dimly lit by a small lamp under the front cove. The process of giving a lesson for the deaf is a little slower because while the interpreter signs, the visuals or events cannot be demonstrated or shown on the dome. It doesn't work well to do both at the same time! While the students are looking at the dome, I often use Kodalith captions for further identification or explanation. The lamp for the interpreter is turned off or dimmed while the students are looking overhead, then brightened slightly when the interpreter signs.

I think it is important to provide opportunities for special students in the planetarium whenever possible. Sensitivity to their needs and a little imagination will go a long way toward providing a meaningful experience.

David E. Parker, Director
Tipton Planetarium
Tipton, Indiana

Our planetarium is situated in a school corporation with about 2200 students K-12. Our school cooperates with several area schools to provide education for special students. Housed at our school are moderately and mildly mentally handicapped, learning disabled, and severely emotionally handicapped students, while hearing impaired, multiple physically handicapped, autistic, and severely handicapped students are taught at another school corporation.
In the Virginia Living Museum's Planetarium, I've developed a live "Sky Tonight" type program for hearing impaired groups, which mainly uses the communication technique of signing. The program is presented by a lecturer whose narration is interpreted by a qualified signer. Single word or phrase captioning is used during the show only to introduce new or difficult words.

I think that relying on a signing interpreter for the bulk of the lesson is the best possible way to communicate to the student. In a live program it's easy to tailor the program to the audience, and there's a much higher level of participation. It's also spontaneous, and personally more rewarding to the lecturer.

A dry run with the interpreter before the group's visit is essential! Sentence structure and lecturing style play an important role in the show's effectiveness, and the signing interpreter can be helpful here in determining which phrases or story developments work well, and which don't.

Storytelling as a lecturing style works quite well, particularly those stories tied in with the mythologies of the planets and constellations. Also, storytelling becomes very descriptive and expressive when signed, and as an art form by itself, is beautiful to behold. Different stories are told, according to seasonal changes of the sky and constellations.

Very few of us in the planetarium field are qualified signers, and not many facilities can afford to hire their own interpreters. I've found that the deaf community is a good source of interpreters, and have required hearing impaired classes to come with their own interpreter.

But by all means, learn a few signs. Direct communication with the deaf audience is the best way to conduct a show. Most colleges offer introductory signing courses, and building a vocabulary poses no great difficulty. In taking my first signing course, I was struck by the pictorial logic of the signs, and especially by the astronomical connotations of many of them (see illustration). At the very least, have your interpreter teach you how to introduce yourself and say "good morning".

Our facility solves the problem of being able to see the interpreter in the dark by the use of special lighting. It's necessary to illuminate not only the hands, but the arms and face of the interpreter as well, especially during the storytelling sections. A 45-watt, red dimmable spotlight mounted on the cove and aimed straight down, works quite well; the interpreter can be easily
should experience an blind or deaf people ought to be the one which is a good first step.

We like to give our audiences a chance to ask questions, and think up answers to some of our questions about the sky. By experimenting, we found the group most responsive to interaction during the beginning and end of the show, (as might be expected), and also during the city night sky identification—there was still enough ambient light at this time to allow facial expressions to be seen. We’ve found that two-way communication is virtually impossible under darkened country skies, so in this section we emphasize lecture/storytelling techniques.

During the program we emphasize the visual medium as much as possible, using our best effects. But we also use music. Most of the children we’ve taught have severe hearing impairments, but are not totally deaf. Therefore, music is used, from walk-in to sunset, etc. It’s important not to turn the volume up too much, though; this can be a painful experience for anyone wearing a hearing aid! It’s likewise not necessary to shout, but do speak clearly and succinctly, keeping your face and mouth in view of the audience as much as possible. And always talk with the handicapped individual directly, not in the third person. Make eye contact with them, not the interpreter or helper.

I’ve found the experience of working with these students rewarding and delightful, and I hope to have many more such contacts in the future.

Jon U. Bell, Astronomy Director
Virginia Living Museum
Newport News, Virginia

At the Charles Hayden Planetarium, we are committed to making our programming accessible to ALL special needs visitors.

Last spring we received a grant from our Museum’s Service League for $4,000 to purchase a Versapoint Braille Printer. With this embosser, we have been creating tactile astronomy-related illustrations, including constellations, planets and galaxies. These images are printed on paper so that we can distribute them in booklets, for free, to our visually impaired visitors. Usually, we put together a booklet of 2-5 pictures which pertain to our shows and we have pictures which could correspond to any of the public or school programs that we offer. We are also in the process of developing a 3-D
"Astronomy Box" of models for blind persons visiting our planetarium, to help explain difficult concepts.

Due to the increased interest in our tactile illustrations, the Charles Hayden Planetarium is publishing a Braille/Large Print astronomy book (44 pages) entitled "Touch the Stars," which will include 11 tactile illustrations. The book will be available in mid-May and will be marketed at our production cost of $10. In addition, we will make available sets of 20 astronomy-related tactile illustrations at a cost of about $6/set. If anyone would like to order a book and/or set(s) of astronomy tactile illustrations, you can contact Steve Brand in the Public Outreach Dept. at Boston's Museum of Science, Boston, Massachusetts 02114.

... the Charles Hayden Planetarium is publishing a Braille/Large Print astronomy book (44 pages) entitled 'Touch the Stars,' which will include 11 tactile illustrations. The book will be available in mid-May ...

For the hearing impaired, we offer a sign language interpreted program on the second Saturday of each month. The Museum's interpreter sits in a wooden booth during the show and interprets to persons sitting in a particular area of our theater. A 15-watt red bulb illuminates the interpreter's hands and causes no distraction for the remainder of the audience. The Museum's Special Needs Director contacts schools for the deaf to alert them to upcoming interpreted programming. We are, however, investigating an audio system for the visually and hearing impaired, for installation when the planetarium undergoes a major renovation in several years.

When school groups reserve planetarium shows, the Museum's School Services Dept. sends the planetarium a weekly "group sheet." This list, which includes a mention of any special needs students, is particularly useful to the staff when emotionally and physically handicapped students attend, as it guides us in our program presentation. A special area of the theater is reserved for wheelchairs. Each live lecturer makes every effort to speak on "the level" of the students attending the program. Sometimes we have students who are in their late teens and are emotionally at a grade school level and we take this into consideration as to how we greet the students at the planetarium entrance, where we seat the group and how we "gear" the show. We are very flexible and will always do our best to make a special needs visitor feel very welcome and understand that the planetarium is a friendly place to visit.

The Charles Hayden Planetarium works with the Museum's Special Needs Dept. and School Services to encourage special needs persons to visit our theater. Special needs visitors deserve special attention and in the long run, we all mutually benefit from this experience.

Noreen A. Grice, Education Coordinator
Charles Hayden Planetarium
Boston's Museum of Science
Boston, Massachusetts

Translation: "Star Making Machine" = "Planetarium"

Drawings courtesy Jon U. Bell.
Regional Roundup

Steven Mitch
Benedum Natural Science Theater
Oglebay Park
Wheeling, West Virginia 26003
(304) 243-4034
fax (304) 243-4070
CompuServe 72467,2051

I am constantly looking for material to include in the Regional Roundup column. If you are a regional newsletter editor who may have access to a lot of interesting information about individuals, facility upgrades, new facilities, or projects that you would like to share with other IPS members, please feel free to send me your newsletter or information. Of course, you do not have to be an editor to send me material. I'll be happy to obtain material from anyone in any of the IPS affiliate regions from around the world. Just send it to me via any of the numbers listed above.

The FINAL deadline for submissions into Regional Roundup for the next issue of The Planetarian is Wednesday June 2, 1990. This is a bit early due to the fact that I will be in Norway and Sweden in July. Please mark your calendars accordingly.

ASSOCIATION OF MEXICAN PLANETARIUMS
No report. Ignacio Castro Pinal, representative.

BRITISH ASSOCIATION OF PLANETARIUMS
No report. Martin Ratcliffe, representative.

EUROPEAN ASSOCIATION OF PLANETARIUMS
No report. Dennis Simopoulos, representative.

GREAT LAKES PLANETARIUM ASSOCIATION—GLPA

GLPA will be 25 years old this October, as GLPA officially formed on October 8, 1965. One point of clarification that confuses everybody is that GLPA had its first convention the instant it formed. The first convention was held when GLPA was zero years old. That means, this October, GLPA will host its 26th annual conference but will be only 25 years old.

Special plans are underway to celebrate this anniversary during the conference which will be held October 10-13 at the SpaceQuest Planetarium, The Children's Museum, Indianapolis, Indiana. The conference hostess will be Sharon Parker. Additional information can be obtained by contacting Sharon at (317) 924-5431.

The Henry Crown Space Center in Chicago is currently collaborating with an Australian film company to produce Antarctica, which will premiere in the summer of 1991. This production will highlight the history, science, ecology and awesome beauty of Antarctica.

The Shiras Planetarium in Marquette, Michigan is conducting a fund drive to purchase a new star projector.

The Bowling Green State University Planetarium is celebrating its sixth birthday with "Starfest '90," featuring 11 of its past programs.

Dave DeRemer of the Charles Horwitz Planetarium and Gary Sampson of the Wauwatosa West High School Planetarium will be conducting four special astronomy teacher in-services this year which emphasize the project SPICA program.

The revised 1990 version of the Planetarium Source Book is now available for sale at the price of $8.00. The Source Book lists companies and other valuable planetarium resources nationwide in a wide range of categories, including planetarium hardware, projection equipment, films and videos, computer software, teaching materials, telescopes, and reference books. Fully indexed, the 1990 Planetarium Source Book can be purchased with a check or money order made payable to Wauwatosa West High School from Gary Sampson at 11400 West Center Street, Wauwatosa, Wisconsin 53222.

Bob Riddle, Director of Project Starwalk at Peoria's Lakeview Museum Planetarium, reports that a new Project Starwalk (for grades 2 to 6) is currently being piloted by elementary school teachers at 15 schools in 15
western states. The overall theme throughout the lessons is that of motion and changes. Six one-hour training videos have been produced to assist teachers in learning how to use the curriculum materials and portable planetariums. A live satellite teleconference is also planned for next spring. For more specific information, contact Bob at Project Starwalk, Lakeview Museum Planetarium, 1125 W. Lake Ave., Peoria, IL 61614.

GREAT PLAINS PLANETARIUM ASSOCIATION—GPPA

The Lueninghoener Endowment for the Study of Astronomy has been established in memory of Dr. Gilbert Lueninghoener, student, and friends at the Lueninghoener Planetarium in Fremont, Nebraska. The interest from this endowment can be used, as needed, for the updating of equipment and acquisition of new technology for the Midland College Observatory and/or Planetarium. Interest will not be used for general maintenance of instruments and facilities or purchase of equipment that does not demonstrate sound scientific and educational purposes or which would demean the dignity of the College.

The St. Louis Science Center has 48 homing trays FREE to a good home—all we ask is that you pay the freight. They are packed in a shipping crate that measures 50"Lx23"Wx36"H. The folks would like to get rid of them in one batch but would be willing to split them up if several requests are made. If interested, contact Johann Galikin, St. Louis Science Center, 5100 Clayton Road, St. Louis, MO 63110, (314) 289-4459. When you receive them keep a tight rein on them—they are, after all, homing trays.

The next GPPA conference will be held in October 1990 at the Kansas Cosmosphere and Space Center in Hutchinson. For more information, contact host Roger Hoefer at 1100 N. Plum Street, Hutchinson, KS 67501.

ITALIAN PLANETARIA'S FRIENDS ASSOCIATION—AADP

The next meeting of the Italian Planetaria’s Friends Association will be held in Milan, Italy at the Hoepli Planetarium on October 13, 1990. The topic of the annual meeting will be the use of audiovisuals in planetaria for the teaching of astronomy. Host for the meeting will be Enrico Mirotto. Sponsorship of the meeting will be undertaken by the Italian Planetaria’s Friends Association and the Amateur astronomers union of Brescia, Italy.

The Italian Planetaria’s Friends Association is also its first International contest—"Shadows of Time," a contest for makers of sundials. The deadline for the contest is June 31, 1990. For additional information, contact: Unione Astrofili Bresciani, c/o Civici Musei di Scienze, Via Ozanam 4, 25128 Brescia, Italy.

MIDDLE ATLANTIC PLANETARIUM SOCIETY—MAPS

The Middle Atlantic Planetarium Society recently held its 25th Anniversary Conference at Oglebay Resort in Wheeling, West Virginia. The host planetarium for the conference was the Benedum Natural Science Theater. Over 100 persons were in attendance for the 3-day affair. Conference highlights included a Starlab workshop given by John Meader of Fairfield, Maine; a video interview of Margaret Nobel, the founder of the Middle Atlantic Planetarium Society; a special 25th Anniversary banquet and party. Dr. Alan Friedman of the New York Hall of Science gave the Margaret Nobel Address; screening of Cinema-360’s latest accomplishment—Arctic Light, which was produced in Tromso, Norway; and many fine papers and workshops.

The MAPS Distinguished Service Award went to George Hamilton, Vice-President and Director of the Fels Planetarium in Philadelphia. George was honored for his unending dedication to the planetarium profession and for his distinguished service to MAPS. George will be retiring later this year. Congratulations George!

About 40 people attended the 10th anniversary celebration of the Edwin P. Hubble Planetarium in Brooklyn, New York on January 24th. The planetarium, directed by Sam Storch, received a "Proclamation from the City of New York" for its excellence in furthering the interest in science education. Several of Sam’s students have taken careers in the sciences, including one who became a meteorologist, and one who is an engineer for the COBE satellite at NASA’s Goddard Space Flight Center.

The grand opening of the newest Omnimax Theater took place on Saturday May 5th in Philadelphia at the Franklin Institute Science Museum.

NORDIC PLANETARIUM ASSOCIATION

No report. Lars Broman, representative.

PACIFIC PLANETARIUM ASSOCIATION—PPA

During 1990-91, the V.M. Slipher Committee will have $4,500.00 to award for projects that enhance the public’s understanding of astronomy. Preferences will be given to projects requiring seed money for programs that will continue beyond the funding period. Past grants have included support for radio programs on astronomy, refurbishment of an historical telescope for use in a public observatory, and partial support of teacher workshops. Applications must be postmarked by May 21, 1990. Notification of grants will be made around July 16th. For more information, please contact;
Dennis Schatz, V.M. Slipher Committee, Pacific Science Center, 200 Second Ave. North, Seattle, WA 98109.

PLANTERIUM ASSOCIATION OF CANADA

No Report. Ian McGregor, representative.

ROCKY MOUNTAIN PLANETARIUM ASSOCIATION—RMPA

The Rocky Mountain Planetarium Association held its annual conference April 20-22. Conference highlights included several speakers from Boeing, Martin-Marietta, the National Center for Atmospheric Research, Colorado State University and the Chairman of the Astronomy Department at the U.S. Air Force Academy. Topic covered such items as The Moon-Mars Initiative; Magellan, Galileo and Tethered Satellites; Global Warming; Responses to 'New-Age' beliefs, i.e. Astrology, Crystals, etc.; and On-line Observatories.

SOUTHEAST PLANETARIUM ASSOCIATION

No report. Dave Hostetter, representative.

SOUTHWEST ASSOCIATION OF PLANETARIUMS—SWAP

Please forgive an error that I made in the last issue of The Planetarian. I inadvertently made Donna Pierce the SWAP Newsletter Editor. Donna is the SWAP IPS Representative. Sorry, Donna.

The SWAP Annual Conference was held at the Hudnall Planetarium at Tyler Jr. College June 10-13. SKILL-SHARE '90 was sharing the educational skills and show-production abilities of the planetarians of the Southwest. With focus on EDUCATION, seminars were held on education-related issues; workshops on new approaches to teaching in the planetarium; and seminars on computers in planetarium education. Show production included audio, graphics and special effects workshops. Special attractions included: original script and soundtrack competition; Show-a-rama; Hardware Alley; Electronic Music; and a SWAP Consortium aimed at designing, scripting and producing new planetarium shows by and for SWAP members.

To celebrate the retirement of Professor Paul Engle, the Mid-South Astronomical Research Society in conjunction with the University of Arkansas at Little Rock hosted a National Astronomy Day Public Star Party at Pinnacle Mountain State Park on April 28th. Participants were treated to a re-cap of Paul's exciting and distinguished career in astronomy and aviation. The following day a Reception/LASER light show spectacular was held in the Planetarium on the campus. All proceeds from the events and activities went to the Paul R. Engle Endowment Fund.

 coursework, continued from page 39)

Planetarium Festival. They elected to dedicate this award to remember Arthur as a friend and a professional planetarian. ..... Brian Deis has been appointed Sales and Marketing Representative for the Planetarium Department of Minolta Corporation's Document Imaging Systems Division! Deis was president of the Santa Cruz Astronomy Association and has studied and lectured on astronomy for the past ten years. ..... Thomas Hocking, reports the Morehead Planetarium at the University of North Carolina was dedicated as an Astronaut Training Center for Celestial Navigation for Mercury through Skylab. The dedication of the brass plaque was held late last year!

Hubble Space Telescope:

Our dreams, hopes, and best wishes go with you! Good luck.

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Precision Projection Systems Projectors
Image Engineering Computer Graphics
& Digital PCM Recording System
Fostex Synchronizers
Laser Fantasy Image Synthesizer
Sony Editor & Professional Video Equip.
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Equipment sold on a "best offer" basis.

Direct inquiries to:

TEL: (213) 395-1301
Hi again. Dale Smith from Bowling Green State University Planetarium in Bowling Green, Ohio, 43404-0224, sends several calendars. They produced them for their show "It's About Time" in 1987. They are (a) a pre-Julian Roman calendar with 12 synodic months of 29 or 30 days, labeled in Latin day names; (b) same with 13 synodic months; (c) original Julian calendar with 5 31-day months and 7 30-day months, including February, July, and August, labeled in English (beginning the year with January 1); (d) modern calendar with the 2 days stolen from February and added to July and August; (e) 1751 in the British Empire (it ran March 25 through March 24, like preceding years); (f) 1752, when the British adopted the Gregorian reform (the famous 11 days were skipped in September); and (g) 1753, with the year now beginning on January 1. The 1752 calendar is reproduced below—contact Dale for copies of the others.

Thanks, Dale! Now to all the rest of you—it's your turn. Send good copies of black and white, copyright free artwork to me at the address above.

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**1752**

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*The Planetarian, Vol. 19, No. 2, June 1990*
Jane Hastings
Thomas Jefferson Planetarium
4100 West Grace Street
Richmond, Virginia 23230

As I stood in line for the cashier at the discount drug store, I noticed the revolving Timex watch display conveniently located to tempt waiting customers. I counted watches and then smiled a secret smile. Of the 48 watches displayed, only 7 showed digital faces. The other 41 were good ol' clock faces, with 12 numbers and hands which move to tell the time. A year ago, that same display showed 48 digital-faced watches.

I hate digital-display watches and clocks. Never did take to 'em. Part of it is a mental thing I have: if I see "4:46" displayed on a watch or clock face, I have to transfer that information in my mind to an imaginary clock with hands before I get a feel for what time it really is!

My main problem with digital time-displays is that it just seems unnatural. Clocks should be like the first timepieces, sundials, with sticks or shadows moving in a circle.

I tried to adjust, I really did. In the era of digital displays, I couldn't resist buying a $2.00 digital watch. It included instructions which said that if the watch ever failed to work, you could send it back to the company with $2.00 and get it fixed, free! Another one I bought I could never set because the little pegs on the side of the watch horribly mangled the fleshy part of my index finger when I pushed them. On another one, the position of the little pegs on the watch did not match the position of the little pegs on the accompanying setting diagram. I got the alarm on by messing with it, then couldn't get it off; I couldn't set the correct time. I threw it in the trashcan in my bedroom where it kept reminding me of its presence once every day with paper-muffled peeps. But my worst moment came when my beloved 20-year old clock radio just wore out during the digital era, and I COULD NOT FIND A REPLACEMENT WITH FACES AND HANDS in the stores! Digital display was everywhere.

So, in my planetarium, how was I going to teach about the rotation of the earth?

Me: "The earth rotates counterclockwise; you know, backwards from the way the hands on a clock move."

Student: "Excuse me, Mrs. Hastings, but what are 'clock hands'?"

Well, as you can see, the words "clockwise" and "counterclockwise" had to be removed from my lessons. I could not tell students that the counterclockwise rotation of the earth made objects appear to move clockwise around the earth. We could not marvel together at the mystery of why a counterclockwise-rotating globe as seen from the north pole, appears to rotate clockwise as seen from the south pole. I had to eliminate all such wonderful observations during the digital era.

But that's all over now. My secret smile at the drug counter revealed delight in discovering renewal of the sensibility of mankind. The insides of watches and clocks may have changed, but faces and hands are back! "Clockwise" and "counterclockwise" are back in my planetarium vocabulary—where they belong.

Overheard:

Katherine Becker, Planetarium groupie from Omaha, Nebraska, wondered if expressions like "He doesn't have both oars in the water" or "He's a few bricks shy of a full load" could be customized for planetarians. Since no one else would tackle such a worthwhile project, she did!

- She says how about: "His arc is firing but his stars aren't on ..."
- "His tray's not fully loaded ..."
- "His lamp is burning, but his fan's not on ..."
- "The comet's gone but he's still showing his Halley show ...">
- "His zoom's not fully extended ..."
- "He's a few planet cages shy of a full solar system ...">
- "He's so dumb, he thinks that S.O.B. stands for 'Star of Bethlehem' "
- "His elevator doesn't go all the way to the top"

George Hastings, Starlab Planetarian in Richmond, Virginia couldn't resist adding to Katherine's list: "If he were any smarter, he would be a dork."

Mike Ryan, from Lake County Planetarium of Howey-in-the-Hills, Florida, was teaching astronomy to 25 middle and high school teachers. As he romanticized that the ancients thought the hazy Milky Way was goddesses with large jugs of milk at the top of the sky, his audience broke up with laughter. They pointed to a sketch he had left on the front board showing a binary pair of stars and a possible figure-eight orbit of a planet in such a system.

The Planetarian, Vol. 19, No. 2, June 1990
Walter Bauersfeld’s invention of a machine that projects dots on a dome created a revolutionary new way for millions to discover the wonder and majesty of the night.

But the seven decades since have witnessed a revolution in our understanding of the heavens. Phrases like black hole, quasar, supernova, big bang, and evolving galaxy come to mind.

The planetarium has been hard-pressed to keep up.

Enter Sky-Skan.

In one elegant stroke, our new special effects video discs (Volumes 1-4 now available) teamed with our incredible NUTMEG Video/Audio Controller have closed the gap. Now, for about 1% of what it costs you to show the sky, you can roam the universe, accessing dozens of vivid effects instantly.

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