SOUTHERN SKIES

Volume 10 Number 4 Fall 1990

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Journal of the Southeastern Planetarium Association

SUBMISSION GUIDLINES:

Articles should be submitted in one of the following formats:

1) mailed on a Macintosh disk (400 or 800k) (preferable)

2) mailed as **double-spaced** typed or printed copy on paper

Articles submitted on disk should be accompanied by a printed copy that notes italics, boldface, accent marks, and any other formatting instructions. On the disk have two files—the formatted file, and a text-only file. If you use any special fonts please include them by including a copy of your system file.

All articles should be accompanied by author's name, mailing address, and telephone number, as well as a statement to the Editor granting or refusing permission to reprint the article in other forms. Accompanying art must be labeled.

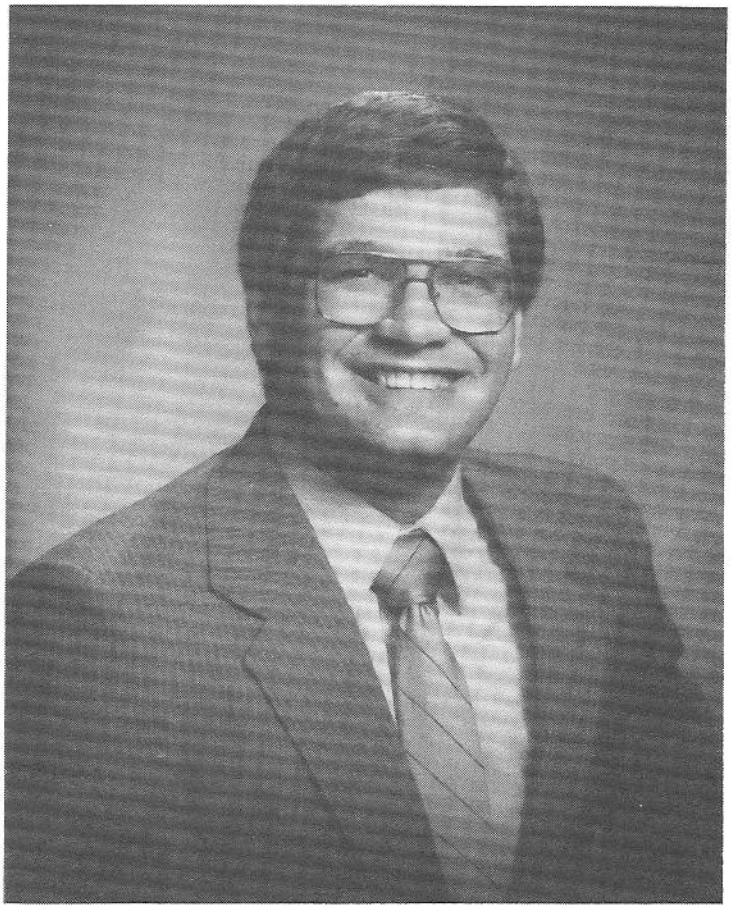
DEADLINES: Submit all copy and artwork to the Editor in accordance with the following deadlines:

Winter Issue (No. 1) January 1
Spring Issue (No. 2) April 1
Summer Issue (No. 3) July 1
Fall Issue (No. 4) October 1

Southern Skies

Volume 10 Number 4 Fall 1990

A Message From The President



What a summer! The SEPA Conference in Kentucky, the IPS Conference in Sweden, a week's vacation in Germany, and (somewhere along the line) about 125 planetarium programs, workshops, and field trips. But now it's Autumn, and somehow things seem different. Oh, yeah -- school shows.

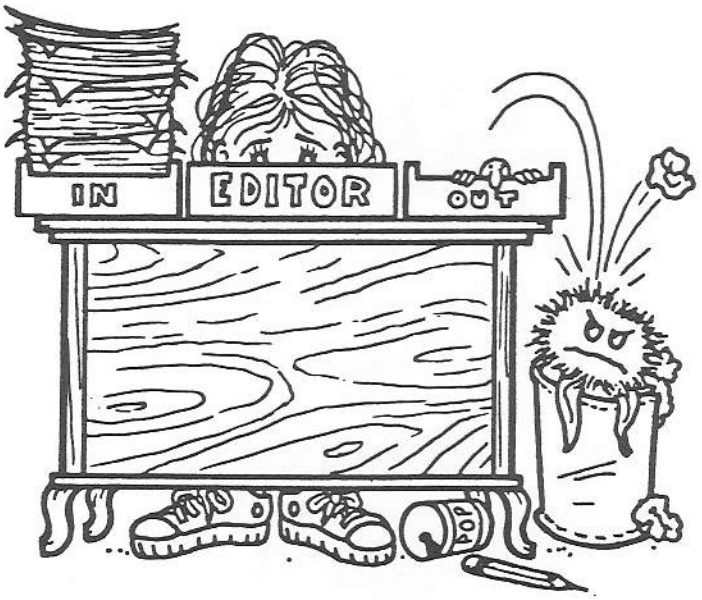
I hope you were one of the many who made it to the SEPA Conference at Hummel Planetarium. It was another of our traditionally fine ones, and my thanks go to the Hummel staff for their hard work in preparing for us.

As SEPA President, I represented the organization at the International Planetarium Society Conference in Borlange, Sweden, in July. It was a dirty job, but somebody had to do it. There is a report on the conference elsewhere in this issue, but I should mention here that IPS will be back in the SEPA region for its 1994 Conference: at Mike Hutton's facility at the Brevard Community College in Cocoa, Florida. Judging from the SEPA Conference in Cocoa a few years ago, it may not be too soon to start catching up on your sleep.

I visited southern Germany the week after the IPS Conference, including the region from which my ancestors emigrated 150 years ago. It was interesting to visit a couple of planetariums during the trip, although my command of the German language allowed me to understand only bits and snatches of the programs. OK, OK, so I didn't follow much of the stuff about relativity in Stuttgart, but I had the constellations under control in Munich. If you ever find yourself in Munich -- something to be highly desired, by the way -- don't miss the Deutsches Museum. Its astronomical collections include the first projection planetarium, 17th Century telescopes, and a variety of interesting space vehicles. The wiener schnitzel at the Museum restaurant's not bad, either.

As 1990 comes to a close, I've enjoyed looking back over my two years as SEPA President. I enjoyed the job, and hope I represented you well. My thanks go to everyone in the group who helped out in one way or another, whether by working in a committee or at any other job, but particularly my thanks go to Linda Hare and Kathy Summers. Linda will be turning the editorship of "Southern Skies" over to Kathy at the start of the year; please give Kathy the help she needs by sending her an article.

OK, Bob, it's all yours.



What a summer!

We had that great SEPA conference in Kentucky, thanks to Jack Fletcher, Cory Anderson, and staff at the Hummel. As usual, after a SEPA conference, I came away feeling very learned and enthusiastic.

This year the conference brought me an added bonus. My SEPA colleagues gave me the opportunity to serve as their Secretary/Treasurer. It is both an honor, and a very large challenge. Sue Griswold has done such a great job in that position and I only hope that with her assistance in getting started I can come close to her caliber. I want to thank all of those who voted for me, for giving me the opportunity to serve in this capacity.

Because I ran for the office of Secretary/Treasurer, I had to give up the position of Journal Editor. I had mixed emotions about this one. I have enjoyed doing *Southern Skies*, and wasn't certain that I wanted to give it up. After finding out that Kathy Summers was willing to take over the editorship, my decision was made. Please send Kathy tons of articles and information, and remember - the Jo rnal can not be complete without "U".

I would like to thank everyone who sent me articles over the last few years. I would particularly like to thank my "regulars" who have been there every time I hollered: Jon Bell, Joe Hopkins, Dave Hostetter, Richard McColman, and Joe Tucciarone. Also, thanks to Kris McCall for never forgetting to send tid bits and keeping in touch, and to Brian Matthews for always being there when I said "Hey Brian - can you come up with an illustration for.....".

Thanks again for allowing me to serve in the capacity of Journal Editor for the past several years, and for the opportunity to serve SEPA beginning the first of the year as Secretary/Treasurer.

And now, for the rest of the summer...

When I returned from Kentucky, my plan was to get the Summer edition of *Southern Skies* edited and in the mail before leaving for the IPS Conference. Instead, as stated in the note you received instead of the Journal, we had to tend to an unexpected accident. Our youngest daughter, and our nephew were involved in a motorcycle accident, and I spent two weeks going to and from the hospital instead of editing. Both kids are doing fine now and we are very grateful.

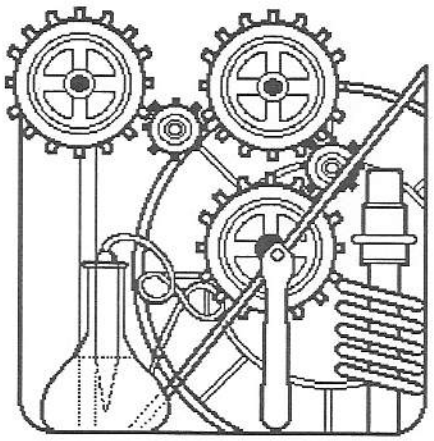
On July 9th, John and I took off for a fabulous journey which included the IPS Conference, a 50th birthday celebration for John, and visits to planetariums in Norway, Sweden, Finland, England, Russia, and the Herschel home in England.

We returned home on August 7th, and immediately back to work. The Bishop Planetarium has been closed for major renovations, with the grand reopening scheduled for October 23rd. More about this in a future issue.

Again, I want to thank you all for the opportunity to edit *Southern Skies*. I have learned a lot from this experience, mainly - be careful never to say to Jon Bell, "If you need any help, give me a call."

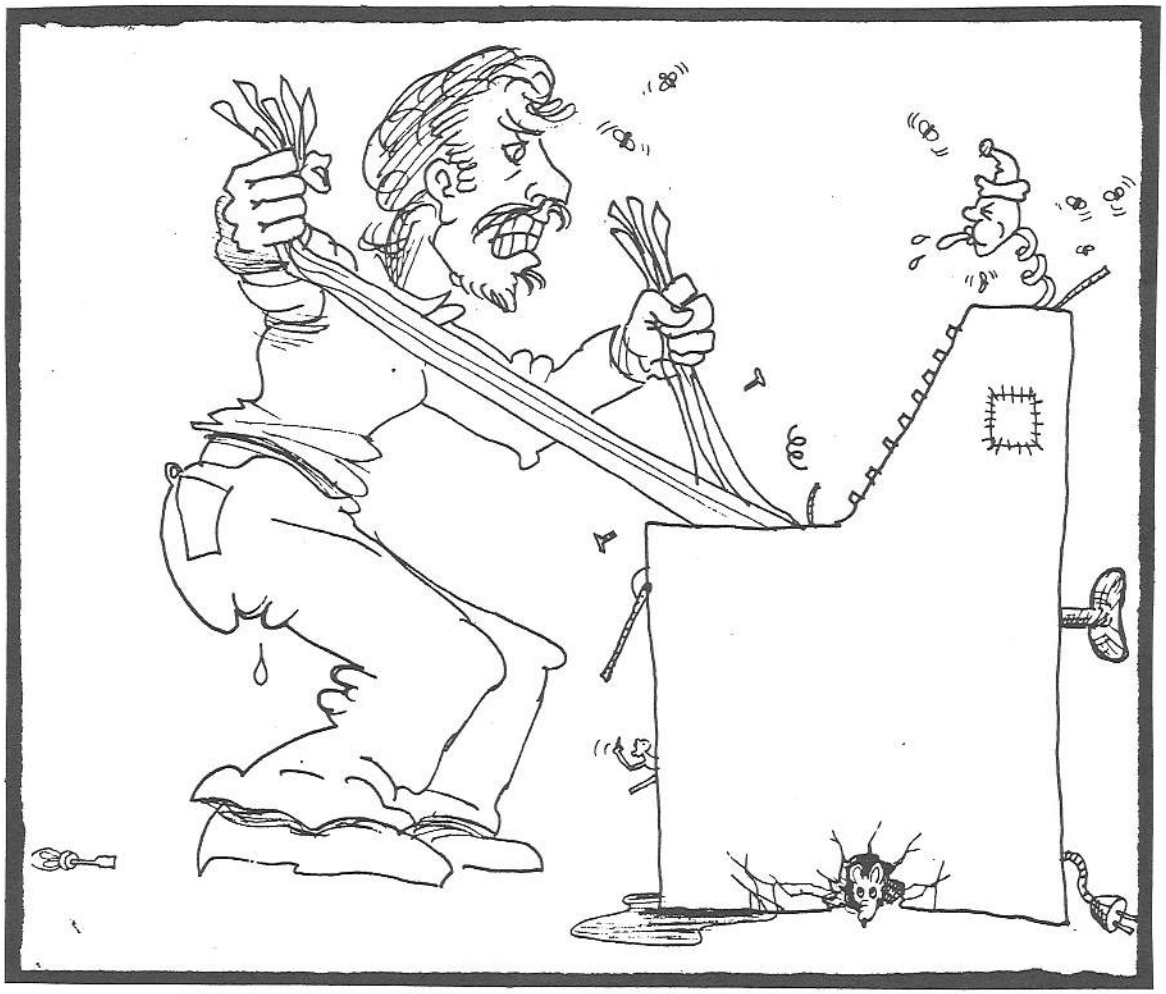
Please give Kathy Summers your support, and send items for the Journal to her at:

661 Paden Mill Trail
Lawrenceville, GA 30244



Doctor Strange's SEPA Circuits

by Joseph M. Hopkins
Bishop Planetarium
Bradenton, Florida



Dr. Strange has not forgotten us folks! The Bishop Planetarium has been undergoing a complete renovation, and the good Doctor has been putting in 48 hour days. He promises to be back with us in future editions of *Southern Skies*.

by Richard McColman
Gibbes Planetarium
Columbia, SC

Of Giant Suns and Misconceptions

At the 1990 SEPA conference in Richmond, Kentucky, Charles Ferguson of Bays Mountain Planetarium showed the Small Planetarium Group a neat technique that he has come up with to help visualize giant Sun images on a dome using a single-projector all-sky system. He explains:

"I have always been less than pleased with images of the Sun projected by super wide-angle and fisheye lenses. We like to use the Sun in a fisheye projector to create a truly impressive solar presence and to visually establish that the Sun is big! The only problem is, photographs of the Sun are inherently lacking in resolution, and enlarging them to enormous sizes doesn't help the image quality. One solution, of course, is to have one of your 'many artists' create a detailed piece of art. I'm certain that the many hours spent on accurately rendering the solar granulation and other details will be richly rewarded when the final product is projected."

"I have discovered a cheap and easy alternative. While it isn't a true reproduction of the Sun, it does work well and will carry you over until 'your artist' is able to complete the aforementioned artwork."

"The high-tech environment of today's planetariums should provide easy access to the requisite materials. Begin by obtaining a clear piece of film (a section of unexposed, processed Kodalith left over from previous work is ideal). Since the Sun is a sphere, a circular mask is required. You can use a circular aperture slide mount like the ones from Wess Plastics or, the piece of Kodalith could be a circular mask rather than clear film."

"Spray both sides of the Kodalith with a nice coat of 'Matte Fixative', a spray used by artists to protect sketches and delicate artwork. The fixative spray creates a fine crinkle pattern which looks like solar granulation when projected."

"Sunspots are simulated with permanent markers. First, find one that is gummy and nearly dried out. Use it to make spots that are gray and splotchy, but not black. Use a good, fine-tipped pen to make nice black spots within these grayer spots. Next, carefully group some smaller black spots nearby to simulate patterns made by sunspots. Insert this in the slide mount along with a yellow gel and Voila!--instant Sun."

"The results look great through ultra-wide-angle lenses and fisheyes, where the resolution of the lens tends to be poor. If projected through a normal lens, I suspect the slide might look like someone marked a slide with a magic marker, unless you work very carefully!"

"Of course, this technique doesn't have to be limited to only the Sun. Experiment with red giants and white dwarfs by changing the colors and sizes of the circular masks. Who knows, you may like the results well enough to cancel your request to your 'art department'."

Charles' technique looks like a really innovative way to concoct impressive visuals for your solar system or stellar evolution show. Since small (and some not so small) planetariums are in constant need of inventive ideas such as this, I would like to encourage everyone to jot down a few words about their special creations and send them in. This would be a great forum for brainstorms of this sort, and besides, what better way to keep from having to wade through my endless babbling. Thanks a bunch, Charles.

Astronomical Misconceptions

In 1989, veteran planetarium director Jeanne Bishop authored an article in the *Planetarian*, entitled "We're Regarded as Experts", in which she detailed survey results on how planetarium audiences can generate misconceptions concerning astronomical phenomena and principles while watching our shows. Included in this piece were accounts of such seemingly harmless acts as occasionally running diurnal motion backwards (for the sake of time and the convenience of the console operator), with accompanying verbal explanations that "this really does not happen".

Despite this disclaimer, according to her account, audiences frequently left the theater firmly believing that "the stars appear to move eastward sometimes and westward sometimes as the Earth rotates". (This example is a powerful testament to the effectiveness of visual vs. aural stimuli.) While Bishop concluded the article by admonishing planetarians to avoid such potential pitfalls in astronomy understanding, I must say that, based upon my own experiences, such a goal isn't always that easy to achieve.

I remember, for instance, as a young teenager in December of 1968, following with great excitement the television coverage of the historic lunar-orbital mission of Apollo 8. Marvelling at the giant "flight tracking chart" behind Chet Huntley and David Brinkley, I decided to make one myself, so that I could have fun plotting the distance of the spacecraft from Earth during its flight to and from the Moon. I started by drawing out

on a piece of wood a small-scale replica of the NBC map -- down to the same proportional sizes of Earth and Moon and the distances between them (all the while eliciting quizzical facial expressions from Mon and Dad as I repeatedly held a ruler up to the TV screen and hurriedly scribbled computations on a slip of notebook paper).

Proud as punch throughout the remainder of the flight, I moved the little spacecraft marker, measuring and plotting its successive positions on my chart against the NBC board and mileage distances detailed in the newspaper. But, within a couple of days, confusion began to set in. The size and distance relationships on my chart (as well as on the NBC counterpart) weren't working out. If the Earth and Moon were roughly 250,000 miles apart, then both objects on each of the maps seemed to be way too big. In fact, the Earth would have to be more than ten times its actual size for the charts to make sense!

"But that couldn't be", I told myself. "How could NBC have made a mistake?"

For days and weeks I puzzled and calculated, trying desperately to reconcile the irreconcilable. Finally, I began to seriously entertain a radical, almost blasphemous idea -- that somehow NBC, that bastion of great knowledge and wisdom, that constant living room companion of unshakeable authority, had to be...WRONG!

Quite a revelation for a thirteen year old.

A few years ago, we at Gibbes decided to install an exhibit on the planets in a vacated display case adjacent to the planetarium. In considering the task, then-planetarium director Steve Morgan and I mulled over the various educational issues involved in making the exhibit as attractive and as understandable as possible. In looking back upon my sporadic astronomy education as a child, I remembered how confused I had been by the manner in which the solar system was frequently illustrated in books and on posters. The most baffling thing for me to comprehend had been the way perspective-style artwork depicted huge planets trucking along orbital paths that weren't an awful lot larger than the worlds themselves. It seemed, in studying such illustrations, that the planets weren't really that far away from each other relative to their depicted diameters. You can therefore imagine my confusion as, when peering through my new 2 1/2 inch Gilbert Scientific reflector, Jupiter and Saturn appeared pea sized at best. Although very much impressed (unlike many kids these days) by even these first primitive views through my scope, I was bewildered by the obvious discrepancy between the book artwork and the magnified images of the real planets.

For this reason, I indicated to Steve my concerns about attempting to arrange the planet models in the display case in a conventional fashion. It was agreed, therefore, that our simulated planets would be arranged in a more random pattern, without regard to their actual relative solar system positions, and that they would merely serve to indicate the size and appearance relationships of those various worlds. In fact, a written disclaimer would be included in the beginning of the label copy for the exhibit explaining, "No attempt has been made to accurately portray the location of the planets or their relative distances from the Sun. Only the SIZES of the planets are modeled to scale". With that we were confident that we had done our part in minimizing the potential for misconceptions in the minds of visitors.

Well, perhaps...and perhaps not.

It just so happened that a couple of years later, another SEPA planetarian visited our facility, full of kind words about our planetarium operation. He was, however, very much bothered by our planet display, expressing grave reservations on how the public would, despite our disclaimer, likely interpret the random arrangement of planet replicas as representing the actual positions of those worlds within the solar system.

I was secretly exasperated! I knew from first-hand experience that attempting to show the planets' relative positions while using distorted distance-to-diameter scales created real conceptualization problems. But, here was this planetarian telling me that people were going to acquire serious astronomical misconceptions if we didn't do exactly that. It seemed that misconceptions could only be avoided by again rearranging the planet models and shrinking them down to virtually microscopic size!

Alas, I have since concluded that planetarians (indeed educators in general) are faced every day with a dilemma--that it is essentially impossible to do our jobs with such perfection that everyone, whether child, adolescent, or adult, will walk away without a misunderstanding about some scientific fact or principle.

A good illustration of this point is tied-in with another example cited by Bishop. In her article, she complains about the use of certain "meteor shower" special effects which show a greatly exaggerated rate of infalling meteors. On one particular unit, Bishop counted three meteors per second, for a total of 10,800 in an hour. This projector, she indicated, would create serious problems for audiences in their understanding the actual rates of meteors visible in such an event in nature.

Apparently, Bishop is suggesting that the rate be slowed down to some unspecified number in order to prevent the possibility of audiences drawing a false conclusion about what they will see during night-sky observing. Makes sense to me.

But, let's analyze this problem just a bit closer. Given such a situation, how much should we slow down the meteor rate...to 20 per minute perhaps? No, even that seems to be much too high a frequency to avoid the

potential for misconceptions. We must make the rate slower still.

Keep in mind that a major purpose of such effects is to depict the "radiant", the apparent origination point of meteors within the shower. My guess is that the minimum rate necessary to illustrate the radiant would be around six meteors per minute.

But, even that frequency is enough to cause conceptual problems for the audience. Since all but the most spectacular natural meteor showers in history possess frequencies too low to practically demonstrate the radiant concept, we are beginning once again to encounter our dilemma. Certainly, given the problem of visual information vs. verbal disclaimers, some visitors will inevitably feel confused, disappointed, and misled when, after seeing six per minute in the planetarium, they go outside and fail to witness more than one meteor every minute or two during an actual shower.

A variant on this issue involves another planetarium effect - the slewing comet projector. While discussing visualization techniques over lunch during a conference a couple of years ago, another small planetarian commented on how he hated to see the image of a comet moving through a starfield - again because of the potential for misconception. While we all realize that comets viewed in "real time" do not appear to move noticeably, they do nonetheless, like the planets, trek slowly across the sky from one night to the next.

Planetarians often find themselves in a position of needing to "compress time" in a show in order to illustrate principles and concepts which are difficult for the audience to see or understand under real-time conditions. Few of us would advocate that we never run diurnal or annual motion faster than the motions in nature--it's simply not practical to do so (besides such a philosophy making the planetarium virtually unnecessary). It seems to me that we must assume that certain compromises are a necessary evil, even if a minimal potential for misconception remains.

Before starting our first- and second-grade solar system show, we generally ask groups to name some things that make up the solar system. We get the usual and expected responses: the Sun, planets, moons, asteroids, and so forth (as well as a few incorrect responses: the [other] stars, the Milky Way, the universe, aliens, etc.). Most of the time, at least one child will proudly declare the "orbits" are part of the bunch as well. Of course, while we know that there are orbits in the solar system, I doubt that most kids of that age truly understand the abstract nature of the orbit concept. Memory indicates that at some point in my childhood, my own understanding of orbits entailed a perception that they were actual physical objects--solid bands of material surrounding the Sun, much like Aristotle's crystal spheres. This phenomenon is due to the fact that, while young children are often initially more accepting of abstractions than adults, they also have difficulty discerning the difference between abstract concepts and tangible physical objects.

But, some of the same difficulty stays with us as adults. Bishop showed this in her article by citing assertions from Dennis Schatz of the Pacific Science Center, who indicated confusion on the part of post junior high groups in understanding the H-R diagram. Apparently, many individuals have difficulty comprehending that the "movement" of stars on the diagram does not represent a change of position in space, but rather shows the metamorphosis of the star in terms of its size, temperature, color, and intrinsic luminosity.

What all of this boils down to is that, while we must make a concerted effort to be accurate and to avoid the pitfalls which lead to astronomical misconceptions, we must also temper our teaching theories with a bit of realism. Many astronomical concepts are so complex or so seemingly obscure to the uninitiated that they require simplified or modified demonstrations for clearer understanding. But, on the other hand, the very process of changing, adding, or deleting details in the interest of clarity, will certainly create the potential for some other misconception to be generated.

We must keep in mind that the process of education is often as much an art as a science, and that unlike standardized computer hardware, no two human minds perceive external stimuli in precisely the same way. Each person comes to the learning experience with a completely unique set of educational backgrounds, environmental influences, and genetics - making it impossible to predict all the possible combinations and permutations in which incoming data will be processed in each human mind. All we can realistically hope for is to determine the path with the fewest pitfalls, knowing that, in the end, we'll probably never be one hundred percent successful.

* *

As an addendum, I'd like to take the opportunity to express my appreciation to all those who participated in the recent election of SEPA officers. Thanks to Sue Griswold, Linda Hare, and Mike Hutton for displaying grace and professionalism throughout the campaign, as well as for the years of dedicated service they have all unselfishly given (and will hopefully continue to give in the future) to the organization. Thanks to the nominating committee for their deliberations in selecting the nominees. Thanks also to all those who offered time, work, and encouragement to the candidates (you all know who you are). And of course, thanks to the general membership of SEPA for making the organization a vital entity for the promotion of growth in our field. I only hope that I will be able to meet the leadership needs and expectations of the SEPA organization when the time comes.

The 1990 International Planetarium Society Conference

by Dave Hostetter
Lafayette Planetarium
SEPA Representative to IPS

The 1990 IPS Conference was held in Borlange, Sweden, from July 15 - 20. The extent to which IPS has become truly international in scope was apparent as we received reports from affiliates representing facilities in Scandinavia, Great Britain, several parts of continental Europe, Japan, India and southeast Asia, Australia, Mexico, Canada, and more -- all in addition to affiliates in the USA. I met colleagues from such diverse cultures as Sweden, Germany, Spain, India, Canada, and Chadds Ford; one of the highlights was discovering that the man beside me on one of the buses was from the Leningrad Planetarium (between the two of us, we butchered three languages in one conversation). But, I was pleased to see that SEPA had one of the biggest contingents.

The Council Meeting was on the 15th, but was so much fun we reconvened on the 19th to finish up. If you are an IPS member, there are a few results from the Council meeting (and conference as a whole) in which you may be interested. One, of course, is the 1994 IPS Conference in Cocoa that I mentioned in this issue's President's Message; additionally, the 1991 Executive Council meeting will be in Atlanta around the time of the SEPA Conference. Don't forget, too, that the 1992 IPS Conference will be hosted by Hansen Planetarium in Salt Lake City. Paris, London, and Portland, Oregon, are all rumored to be interested in the 1996 conference.

IPS will continue its support of the "Universe in the Classroom" services.

Changes in the format of the IPS Directory raised quite a bit of discussion, the final result being a decision to print the Directory every two years instead of annually. This will result in freeing funds in non-printing years for other projects. The Directory will be printed in odd-numbered years in order to include members gained at conferences.

The Council also found it likely that dues will need to be raised in the next year, by an amount to be determined.

If you went to the conference, you will be receiving the Conference Proceedings early next year; the Proceedings will probably also be available to members who could not attend.

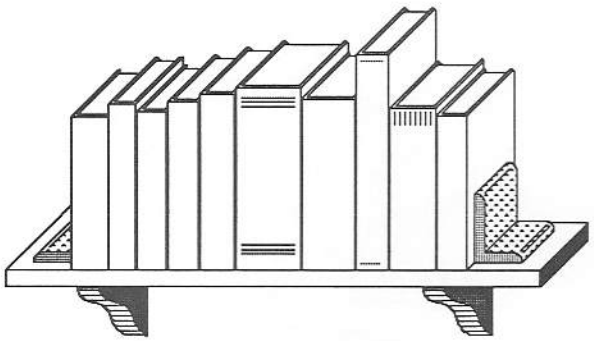
If you need to get pictures and information about the European space effort, try writing to:

European Space Agency
ESA Public Relations Department
8 - 10 Rue Mario Nikis
Paris 75738
Cedex 15
France

OR

European Space Agency
955 LaFonte Plaza
Suite 7800
Washington, DC 20024

Finally, IPS was pleased to gain a new affiliate, the Association of Planetariums of the French Language. It is hoped that the international flavor of this conference will encourage affiliates to organize in other parts of the world, also.



Reviews

by Dave Hostetter
Lafayette Planetarium
Lafayette, Louisiana

Invisible Matter and the Fate of the Universe

by Barry Parker

Plenum Publishing Corporation

ISBN 0-306-43294-3

297 pages

hardback

$23.50

This book is one of several that have come out over the last couple of years dealing with the general cosmological problems of missing mass and dark matter. It's more than a slightly complex and mind boggling part of astronomy, and I'm glad to see these books.

Invisible Matter and the Fate of the Universe covers a lot of ground in cosmology in a reasonably understandable way. The title pretty much says it all -- the book ultimately ends by looking at the concept of closed and open universes, and the critical role that hypotheses involving invisible matter play in our understanding of how the universe might end.

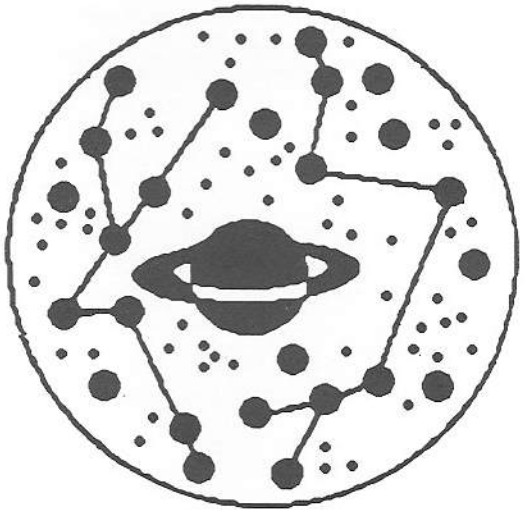
Some of the subjects considered include the curvature of the universe, primordial black holes, neutrino masses and types, magnetic monopolies, supersymmetry, exotic particles, gravitational lenses, and proton decay. Not exactly lightweight reading, but written in an understandable fashion.

Ironically, however, the level on which the book is written is one of its weaknesses -- mainly, I never figured out what the level was, or to what audience Parker was writing. Particularly, early in the book the style seems aimed at the junior high or early high school level, but some of the concepts in the book are pretty sophisticated for that age. Most of the book seems to be written for the intelligent adult layperson with absolutely no previous reading in cosmology, but a better than average understanding of basic astronomy. Its an odd combination, but one for which there may be a market; people fitting that description stop by my console after programs fairly often. For them, this book may provide a gentle introduction to some of astronomy's more bizarre concepts, but the younger aspects of Parker's writing style may be an annoyance.

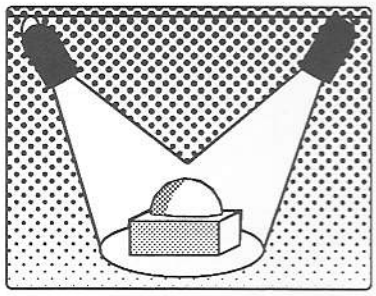
One strength of the book is the determined way in which Parker divides up the question of invisible matter into two parts: dark matter in galaxies and galaxy clusters, and the "missing mass" problem involving closure of the universe; these problems may or may not be related. Another strength (strangely enough) is the confusion shown by astronomers in interviews. They contradict each other fairly often, and seem quite happy about it. It's all a good introduction to the difficulty of doing science at the edge of known physics, and a good demonstration of how knowledge advances through controversy. Clearly, science is not an inexorable march to truth by a bunch of unerring automatons!

I believe Parker should have ended this book with his two good chapters about the fate of open and closed universes. Unfortunately, he includes an extra chapter about the future of humanity, space flight, and the search for life. While interesting, most of the material is off the subject of the book, and the parts that aren't could better have been handled in an earlier chapter. I also have a hard time taking seriously his statements that by the end of the next century Earth will have an infinite human population needing an infinite amount of energy.

Despite this glitch -- and having pages 215 - 222 printed twice in my copy -- this is a book worth reading. You may learn a few things yourself about this complex but fascinating subject, and may find Parker's book a reasonable volume to recommend to those folks hanging around the console.



Featured Planetarium



BERKELEY COUNTY PLANETARIUM

by Elizabeth S. Wasiluk
Berkeley County Planetarium
Hedgesville, West Virginia

Berkeley County planetarium, the little planetarium at the foot of the Blue Ridge Mountains, was built in 1977 along with the new Hedgesville High School in Hedgesville, West Virginia.

When the planetarium first opened, it was extremely simple in design, consisting of a 20 foot dome suspended from the ceiling and containing a Spitz 373 projector. Walls were built to the ceiling to contain the dome and shelter it from exposure to the rest of the building.

Originally, a teacher by the name of Brenda Schockey was chosen to run the facility, and it was opened to students from the district. When Ms. Schockey moved on, the planetarium was not staffed by any one person, and it fell into disarray. By 1987 it was being used as a storage room.

In the fall of that year, the school district began searching for a new planetarium director and hired Elizabeth S. Wasiluk who has served as director since October of 1987.

Prior to 1989, all projector controls were the original Spitz 373 and were located under the projector. The planetarium also lacked proper electrical outlets and the suspended dome could not accommodate cove boxes. Not only was there no place to put auxiliary projectors, but there was also no place to plug them in or control them. There was also very limited space inside and outside the planetarium dome.

Renovation work was done by Joe Hopkins Engineering and local electricians. Additional power lines were installed with controller boxes for auxiliary and carousel projectors. A production studio was designed into a cabinet so that when not in use it can be hidden away and become added table space, thus using otherwise wasted space under the planetarium ceiling.

The console board for controlling projectors can be wheeled to any convenient location for the program being presented. This, along with the fact that the planetarium has no permanent seating, allows us to set chairs up in any arrangement, or students may sit on the floor, giving us a great deal of versatility (we can also accommodate a class of wheelchair bound students).

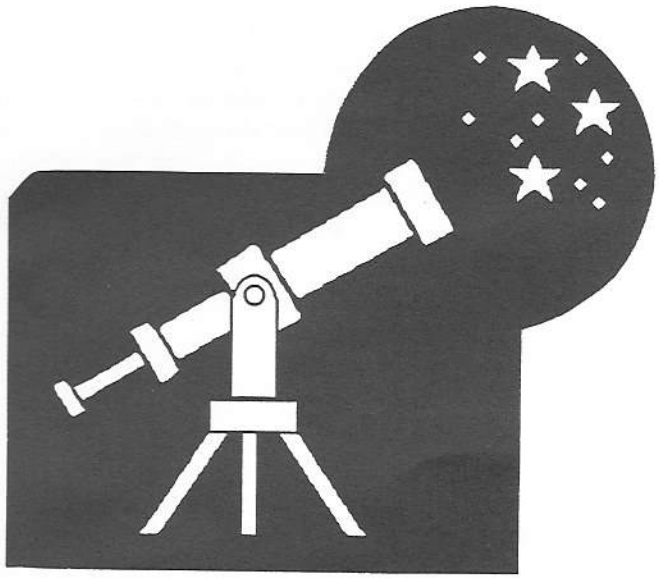
Remotes were placed underneath the star projector for convenience when doing live presentations.

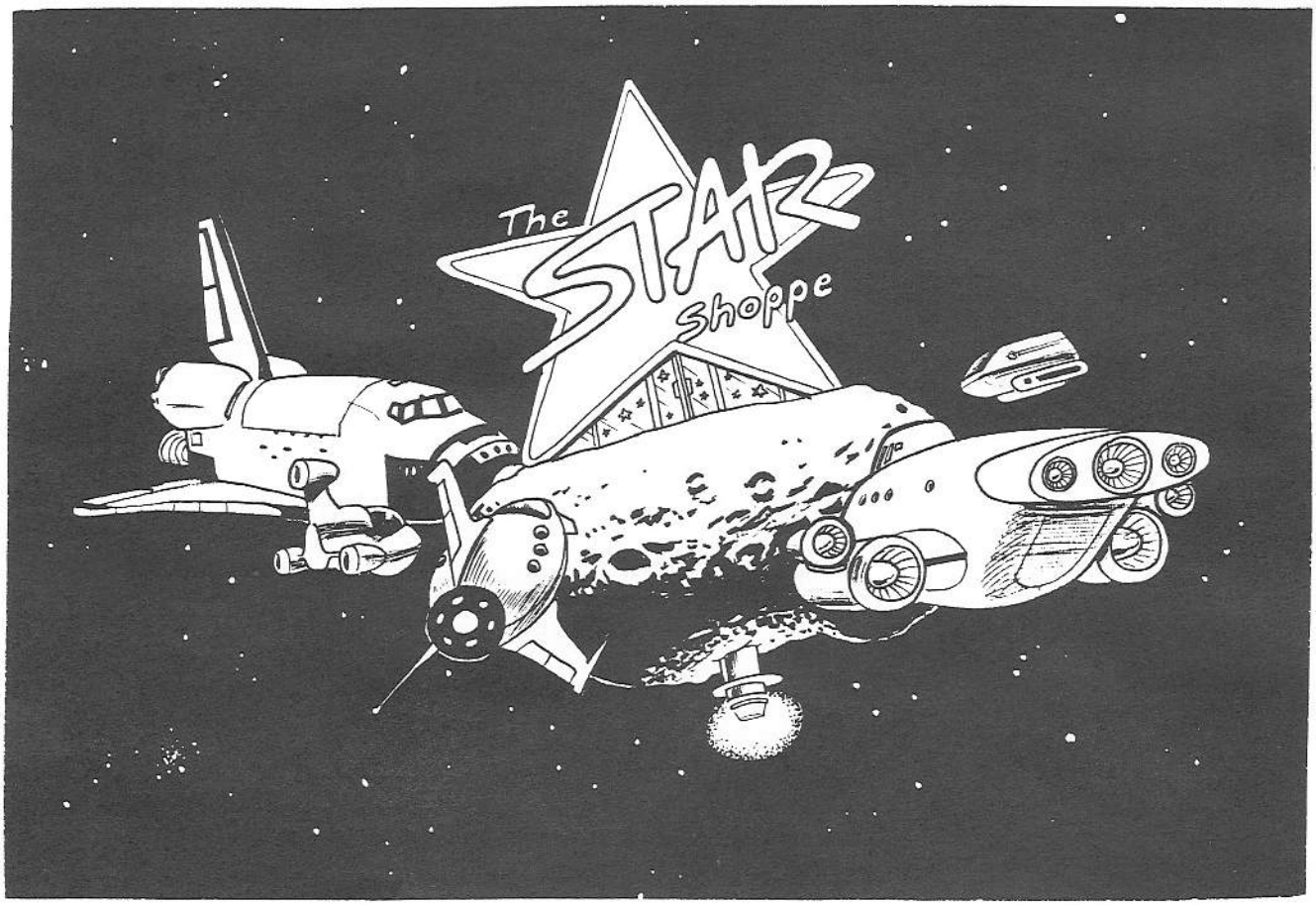
Finally, a new sound system was installed to replace a lined-in tape player and poorly placed speakers.

Berkeley County Planetarium not only serves its own county, which consists of fifteen elementary, four middle, and three high schools, but also areas of four surrounding states: Pennsylvania, Maryland, Virginia, and West Virginia.

We specialize in participatory orientated programming where the audience has an active role in the program they select. This programming compliments the small audiences we accommodate.

Currently, groups visiting the planetarium can select from thirteen different programs in a wide variety of disciplines which include: English, health, Latin, and geology, along with astronomy.





The Star Shop - Cosmic Commercialism At Its Best

By James A. Horn
Morehead Planetarium
Chapel Hill, North Carolina

Many planetariums have gift counters, which help to provide additional funds for the planetarium's primary mission of astronomy education. How well they succeed, however, can be a somewhat unfathomable formula for the unprepared educator, as we found out in a recent study of our operation. The study's results, and the subsequent refurbishing of the area has proved a delightful success story. How this success can apply to your operation is the story of "The Star Shop".

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Greetings from the fifth oldest planetarium in the United States, now completing our fortieth anniversary year...and what a year it has been. The return of the original Mercury astronauts to their former celestial training center started a year of activities, special shows, and hard work that resulted in an increase of 50% over our average attendance for the past five years (132,050 paid admissions to programs including over 34,000 to our fortieth anniversary production "The Legacy"). All in all, it has been a great year.

As a prelude to this exciting year we had decided it was time to rework our aging ticket office. This old lobby is very beautiful and traditional, with vaulted ceilings and leather padded planetarium doors. In a building expansion in 1975 the lobby had been increased in size, but the location of the ticket counter had never been changed to make best use of the added space. The traffic flow was poor, and the patrons had to cross the center of the lobby to purchase tickets. As in all planetariums, it had been decided in 1953 that, as long as you were selling tickets, you may as well sell a pennant with a picture of the planetarium instrument on it as well, and so began the inevitable "gift counter". The profits from such a counter, $75 per year, would be returned to the planetarium to help offset the cost of the person selling the tickets, who would,

of course, act as both ticket seller and gift seller. Thus, the start of most gift sales at most museums and planetariums around the country. As the years progressed, we added items to the behind-the-counter stock and sales grew, reaching somewhat of a plateau in the early 80's of between $25,000 and $30,000 per year. What a deal - money for free from a staff that was already there to serve another purpose.

In 1985-86, the year of Halley's Comet, attendance at the planetarium rose dramatically, as it did at most of our institutions. This increased traffic at our shows also resulted in increased sales at the gift counter and caused a logistical nightmare in trying to serve those people. That, along with the coming fortieth anniversary, and the condition of our aging ticket lobby counter convinced us to look at the possibility of renovation. An old southern adage says "If you always do what you've always done, you'll always get what you've always got". In that spirit we started to design a new and bigger sales counter to be located in an area of the lobby that would promote better traffic flow, allow us to increase the size of the existing counter, and thus increase sales. We were, as usual, wrong.

Fortunately, it occurred to us to ask a few questions about what we were doing and why. We called in the head of the University's Student Stores operation to consult on our counter. He said, "Gentlemen, the concept of self-service was established 35 years ago and is the cornerstone of all current retail trade, particularly where the traffic is there for another reason. Redesign your project and apply the 'point of sale' concept to it, and you may be surprised." Our first reaction, of course, was to ignore him and do what "we know" to be best. The children would steal us blind, where was our absolute security of the counter with all merchandise behind locked glass enclosures, etc., etc. But what the heck, we'd look.

Our new sales manager, Barbara Maddrey, and I started an aggressive campaign to show that we were right. We had our eyes opened by concepts that we had never dreamed of. We visited other, more modern, museum stores in our area. We went to airport stores and mall specialty shops, talked to their managers about modular design, frontage, lighting differential, slot wall, alcoves, mirror placement, merchandise appeal, and traffic to sales ratios. All of these stores measure their business success on point of sale merchandising techniques. These are techniques that are applied when the potential buyers are coming to your facility for some other reason. We were directed to the Museum Store Association, the national organization that promotes museum stores sales and hosts an annual conference where vendors display a tremendous variety of merchandise. Their literature and publications were very helpful in implementing a plan of action.

Needless to say, we started over on our design. We redesigned the physical space to accommodate as many of the things we had learned as we could. We opened up the area and minimized the counter space to accommodate ticket sales, cash registers, and a few nicer items. We overcame the opposition to openness with a nightly activated motion detecting security system. This allowed us to eliminate walls or closures that were costly and which provided artificial barriers to sales in our limited space. We tried hard to design in keeping with the traditional flavor of our old lobby, using brass fixtures and hardware, but we did not allow this to prevent us from using the modular design techniques that would provide flexibility for displays. After much planning and concern, we started construction in January of 1989.

Construction was provided by our Physical Plant. Snail's pace is their maximum operating speed, and we were off to the races. After almost six months we completed the construction, just in time for our fortieth anniversary opening in June of 1989. We were all pleased with the results, but we had spent just over $40,000, and were all concerned that it would take us five years to recoup that investment. In June of 1989 our gross sales were $11,245, an increase of 62% over the previous June, which in itself was triple the best June we had had in our history. For the year we increased sales 93% over the previous 12 months in our old gift counter space. We have realized an increase of 290% in sales over the past five years, to a total of $158,021 this year. We easily recouped the cost of construction in one year. We were indeed very pleased.

Are we a success? I guess so, the figures look good to us. I keep wondering what we didn't do or didn't learn that would have made the figures better. I encourage you to look into how these potential changes could result in increased operating capital for you. Don't be afraid to ask questions, there's likely forty years of marketing history you could be ignoring. Join the Museum Store Association. They are a tremendous source of information about design and subsequent sales. They can be reached at:

Museum Store Association
501 S. Cherry Street, Suite 460
Denver, CO 80222
(303) 329-6968

Most importantly, hire a store manager who is not afraid to be an aggressive advocate of increased sales and who is willing to work toward that end. We did! Barbara Maddrey has been the driving force behind most of our success. Give her a call at (919) 962-1236; she can help. Finally, return the profits directly to the planetarium operation; don't let them be siphoned off by your local University Stores or your Museum Board. If you are like us, you need all you can get. Go for it; take this Cosmic Commercialism to the Bank.

The Return of the Frugal Slide Producer: The Wess VR Converter Punch

by Gregg Tubbs, Producer
Astronaut Memorial Space Science Center
Cocoa, Florida

Have you ever thought about all those stupid little doo-hickies that are all around us that seem so simple and common that they seem to have practically sprung from nature? What about coat hangers? Or door stops, spoons, funnels, planetarium directors (oops!). Recently I've been pondering a wonderful gadget that seems so simple, and makes so much sense, that even it's manufacturer seems to take it for granted. You'd think there would be more of a fuss if someone invented a pin-registered camera that fits in the palm of your hand, needs no power supply, is self metering, self focusing, has only one moving part and costs less than a hundred bucks. Well, that's what Wess Plastics has got, and for years it didn't even appear in their main catalog. You had to order it using a special order number that was available upon request, making you feel like you were buying a popular album on 8 track. But recently, Wess has pulled their nifty VR Converter Punch out of the closet, and it's time we all heard about it.

Years ago, Wess Plastics introduced something called "Variable Registration". This may sound like what you get when you hand tape slides in a mount and the tape doesn't hold, but what Wess had in mind was a simple, dependable solution to align slides originally shot out of register. The VR system merely replaces the sprocket holes as the basis for registration with newly punched holes that match pegs in their line of VR mounts. Though this new registration is managed by aligning images by eye, very respectable results are possible. Once the first slide of a sequence is taped in place on the lighted stage of the punch, all following slides are aligned to it and given two small registration holes located just below the usual sprocket holes. In many respects, this is not *variable* registration, but more accurately *user defined* registration.

This is a good concept and a good system, with the exception of one major pitfall. Once you go "VR" you don't go back. The original and current VR Trimmer/Film Punch units have no accurate means of allowing you to intermix registered and out of register shots. There is no mechanism to retain original sprocket hole registration while using VR registration on other slides in the same sequence. For example, this presented a real problem when sandwiching VR punched slides with soft-edged masks or hard-edged shaped masks. Aligning hard-edged masks by eye in a multi-slide dissolve sequence could give an objectionable "walk" to the slides as they are projected. Another side effect would be poor density matching when using soft-edged masks.

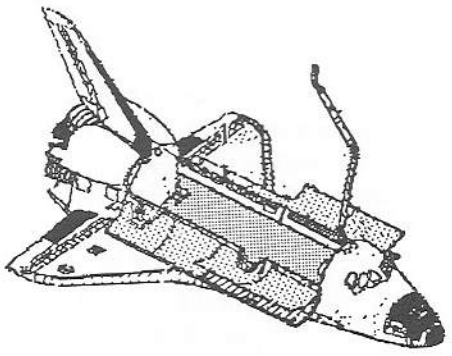
What was obviously needed was a bridge between the two registration standards. The VR Converter Punch is just that. The Converter Punch has a feature that is missing in all the other VR gizmos. It has a "finder peg" located in the upper left corner of the film stage. This finder peg allows you to first seat the slide by using a regular sprocket hole on that finder peg. The slide is then punched with two new VR holes, and ready to be mounted or taped into place so that other slides can be aligned to it. The difference now is that your slides will be aligned to the original sprocket hole registration as determined by the first slide.

The VR Converter Punch should not be confused with it's larger (and naturally more expensive) brothers the VR Film Trimmer/Film Punch units. The Converter Punch is a hand held model meant to punch individual chips of film. It is not equipped with a lighted slide stage or a film trimmer, but it does have that finder peg which is missing in the other VR units. Though it is less convenient for high volume use than the larger units, it can act as your sole source of variable registration. And, with a price tag of only $40.00, compared to $100.00 or more for the other units, the Converter Punch represents an economical way to sample the system. This is also helpful when you consider the fact that you will also need to purchase sufficient VR mounts to get the job done.

All things considered, I think you will find the VR System a fine solution to registration problems, even if you have a pin registered camera. And the VR Converter Punch can be your secret weapon to bring it all together. So if your slides aren't lining up, don't throw 'em away. Throw 'em a punch!

Wess Plastics has relocated to their new offices at:
70 Commerce Drive
Hauppauge, NY 11788-3936
(516) 231-6300
Fax: 516-231-0608

As usual Wess Plastics service personnel will cheerfully answer your questions over the phone, and send you a current catalog at no charge.



L-H-S Level Specification Of Planetarium Capabilities Revision 1.0

A paper presented to the 1990 International Planetarium Society Conference, Borlange, Sweden by Mark C. Petersen, Loch Ness Productions

Several years ago in the music industry, some major synthesizer makers--all competitors--got together and agreed upon a method for connecting each other's keyboards and playing them together. The specification they came up with was called MIDI, for Musical Instrument Digital Interface.

Recently in the computer industry, three of the major players--Lotus, Intel, and Microsoft--got together and agreed upon a method of using a PC's extended memory; they called it the L-I-M EMS 4.0 specification.

Now in the planetarium industry, three companies have combined efforts and agreed upon a method of classifying planetariums by their capabilities to present modern audio-visual planetarium programs. We call it the "L-H-S Level Specification of Planetarium Capabilities Revision 1.0", or simply the "LHS Level Spec". The L-H-S stands for *L*och Ness Productions, Joe *H*opkins Engineering, and *S*ky-Skan. The big question is, "Why have we done it?"

First, we wanted to create a detailed description of what we feel is essential for today's planetarium--no such listing existed. The various levels we've come up with provide a picture of the state-of-the-planetarium-art, and we now have a point of reference.

With such a list prepared, we can now use it ourselves. For Loch Ness Productions, we can classify the shows we produce. For example, our show "More Than Meets The Eye" can easily be shown in a LEVEL 2 planetarium. A show like "The Mars Show" with 300 slides cannot, but it could be a LEVEL 3 show. If our show requires crossfading pans or all-skys, we could recommend it for LEVEL 5 planetaria.

When a new planetarium is being built, the planning committees get various proposals from different vendors, and often don't have a clear picture of all that's involved--they just know they want a planetarium. With this document in hand, Sky-Skan can now say, "OK, here's what's involved--what level of planetarium do you want to build?" It's a kind of shopping list.

Joe Hopkins can say, "Looking to upgrade your theater? Let's see what you'll need to move you up to a LEVEL 4: you've got this and this, but you need that and that." It's right here on the list.

You can use the LHS Level Spec yourself--for support when you go to your administration for money to improve your theater. You can say, "Look, we're not even at a LEVEL 3 because we don't have a zoom or a slew, and we really could use this and this from LEVEL 4. And, the planetarium in the next town is already a LEVEL 5--we need to get on the stick!" With it all in black and white, it'll be harder to ignore; it can simply plant the idea that there IS an upgrade path for improving your planetarium.

At the very least, it might stimulate YOU to investigate various ways you can enhance your theater's presentations--and it lets you know what we vendors feel is important for you and your planetarium to have.

The way it works is simple. To see what level your planetarium is at, you start at LEVEL 1, and work your way up. If there's a line item in the Spec that your planetarium doesn't meet, then you're not at that level yet. You can have some of the capabilities of higher levels, but you need to meet ALL the requirements of a particular level to be considered at that level.

LEVEL 1: Virtually every planetarium is at least at this level. However, some feel this is all that *should* be necessary for a planetarium. Indeed, some proposals for new planetarium constructions have included NO auxiliary equipment, specifying a star projector ONLY. Of course, if our three companies didn't feel differently, we wouldn't be in business.

With the LHS Spec, people interested in building a new facility can see that there's more to a modern-day planetarium than the star projector alone. Maybe 40 years ago that was the case, and certainly effective planetarium demonstrations and star talks can be and are given without auxiliary effects. But, it is incumbent on the planetarium of today to do more than the green-arrow shows of 40 years ago; we HAVE progressed and evolved since then.

LEVEL 2: This level calls for at least **2 slide projectors, and a tape playback system.** We don't specify that they be a dissolve pair, although that certainly would be acceptable. We didn't specify a tape format; probably a cassette would be the typical example. There are many Starlabs that are at this level, and there may even be some at LEVEL 3.

LEVEL 3: Now it starts getting interesting. Again, if there's a line item at this level that a planetarium does not have, they are not at this level yet. We feel that a planetarium wishing to present effective audio-visual programs at this level needs, AT THE VERY MINIMUM, these specified capabilities:

Three dissolve pairs, arrayed Left/Center/Right. Loch Ness customers are already familiar with this format. The screens don't overlap by halves or thirds in multi-image style, because the curvature of the dome prevents that. The dissolve pairs are just aimed roughly adjacent to each other.

A stereo sound system in the theater, fed by multiple sound sources. At a minimum, this means one player for entrance music, and a deck for the show tape. Stereo is mandatory--if you have a monaural sound system, you are living in the 50's; probably the 7-year-olds in your audience have more sophisticated sound systems than you do--they certainly hear better sound on their Walkmans than they will in your planetarium.

You should have the basic tools of the trade for creating motion--**a zoom and a slewing mirror.** Creative people might even aim the zoom at the slew. At any rate, both are as basic as the green arrow.

You need the ability to project at least a **partial panorama**; whether it be one dedicated projector with a wide-angle lens or several, this too is essential for setting scenes in a planetarium.

You need to have the capability for showing animated moving **special-effects**--a comet, meteors, an orrery, rotating planets and galaxies--the "stuff" of space. Note that you don't HAVE to have all incandescent special effects: a video projector and special effects from a tape or videodisc can qualify for *"having the capability"*; Sky-Skan will be happy to sell you their special effects in either form.

You need to have a facility to **mount and opaque slides.** Without specifically dictating it, this implies having at least a light table, Wess glass mounts, and opaquing fluid with a paint brush.

You also need to be able to **dub a tape,** since at the very least, you have to make an insurance copy of your show tape masters. This implies more than one tape deck, and while you could plug the cables from one to the other to meet the Spec, you'll probably want a mixer and additional audio equipment as well. While we don't specify that here, it is specified in LEVEL 4.

LEVEL 4: Now here's where we actually take a stand that might be considered controversial. We feel that if you're going to present a modern audio-visual planetarium show to today's audiences *effectively*, your theater needs to have epi-centric or uni-directional seating.

Now the debate over concentric versus unidirectional seating has been raging for the last few centuries, and will undoubtedly continue. But, we feel so strongly about this point that we included the following statement in the Spec: "The ability to present the same show information (audio and visual) to all seats of the theater equally is paramount to professional presentation."

With concentric seating, from an audio standpoint, you simply can't present stereo sound to your audience--everyone's ears are pointed in a different direction.

Visually, you have two choices: either you project one image that's upside-down to half the audience, or you double up the images and everybody sees two images with one of them upside-down. Either choice is a compromise; neither makes for an effective program.

No matter how much equipment you have, the audience deserves to see and hear it used to its full advantage. To achieve LHS LEVEL 4, in today's planetarium, concentric seating is history.

You have at least **one screen area that is 3 or 4 projectors deep,** so you can do multi-image style animation, or at least a fast lap-dissolve sequence. This means the slide projectors have to be in stackers that allow for precise alignment.

You need an **automation system** that synchronizes your slide projectors and effects with your show tape. We're not specifying which system to use, and you might still run zooms, the star projector, etc., manually; but, some projectors are controlled from the tape.

By specifying a **"multi-channel, multi-speaker professional--quality sound system"**, we've left it open to interpretation. Obviously, stereo sound takes two channels; and to synchronize to tape, you'll need a third channel to store the automation data. By specifying "professional-quality", that will pretty much rule out cassettes as the primary sound source.

You have **more than one zoom**, and **more than one slew**, and the ability to project a full horizon panorama, or as much as your tilted dome will allow.

Video projectors have been here for a number of years; it's time to jump on the bandwagon if you haven't already.

In LEVEL 3, you just had to have special effects *capability*; here at LEVEL 4 we say you should have *multiple* special effects, including rotators, revealers, polarizers, and the ability to do whole-dome effects: snow, clouds, etc.

If you're doing audio-visual programs, you need an **audio studio**, and we've specified some of the basic equipment to have.

Your visual studio has a **camera and copy stand** (which implies lights, a meter, filters, etc.). You need to be able to **duplicate slides**, either on your copy stand, or with a device like a Repronar or Illumitran. And, you need to be able to **mask** and **align** slides. This implies that you have the capability to develop Kodalith and LPD-4 film, which implies a rudimentary darkroom setup--at least a developing tank and a sink. Of course, a clever planetarian will probably have a Wess Variable-registration mounting system and a goodly stock of VR slide mounts; but, that's implicit in the specification to "align slides".

If you've achieved LEVEL 4, you've already got a pretty good setup, and you may even have some of the capabilities of LEVEL 5. Nonetheless, we've spelled them out for you.

LEVEL 5: You have the 6-projector, fish-eye lens, pie-wedge style **All-Sky** system.

You're at least **two projectors deep** on your **panorama** systems.

In LEVEL 4, you had to have at least one screen area that was 3-deep in projectors; at LEVEL 5 you have **more than one.**

Your automation system is based on SMPTE (or equivalent) time code; at LEVEL 4, you could have a simpler beep-tone style of automation to control projectors.

You have a **videodisc player,** and an Oxberry or Forox type of **pin-registered camera** and animation **copy stand.**

Even if a planetarium is at a LEVEL 5, it's certainly not the end of the line. Some have been at LEVEL 5 for many years now, and we'd certainly hope we haven't stopped evolving, growing, and improving. We've created the various levels to give all planetaria something to strive for, and LEVEL 6 specifies even more avenues to explore.

LEVEL 6: If a planetarium is going to do video and do it right, then it will need to equip a video studio: a camera, a switcher, editing VCRs and an edit controller, time-base corrector, monitors, effects units, etc.

Computers are used to generate artwork and graphics, and you'll have a film recorder to transfer the computer image directly to film

Digital audio is here to stay, and the analog tape recorders of the 60's and 70's are going to be replaced by DAT's, and digital multi-track recorders.

You might wish to add the interactive audience-polling systems and programs currently in use in several planetarium theaters to provide your audiences with more reasons to return to your theater more often.

There was a proposal made a while back for "standardization", with details down to what format tape to use and even what channels to record the narration on. That is NOT what the LHS Level Spec is about. You can see it is general enough to allow for various configurations, yet still includes the basic categories of what we feel is important to have.

This is the best part--if you disagree with the levels we've devised, or don't like where your planetarium falls in the LHS Spec, no problem. You can always ignore it. No one's going to force you to accept our plan. Our companies have already come up with it, and we're giving it to you. It's done--here it is.

Of course, we hope that you WILL accept it and that you'll find it useful. If it becomes a kind of "industry standard", or at least an accepted guideline that everyone will know and refer to, great--so much the better. Our three companies are going to use it, and we hope you will too.

LEVEL 1:

Star projector

LEVEL 2:

2 80/tray slide projectors

Tape playback sound system

LEVEL 3:

3 Ektagraphic (or equivalent) dissolve pairs, arrayed Left/Center/Right

Stereo sound system in theater, fed by multiple sound sources

1 motorized zoom

1 motorized slew

Partial panorama

Special effects capability: comet, meteors, orrery, rotating planets, rotating galaxy, etc.

Visual Capabilities: slide mounting/opaquing

Audio capabilities: tape duplication

LEVEL 4:

LEVEL 3 capabilities, plus:

Epicentric or unidirectional seating ("The ability to present the same show information [audio and visual] t all seats of the theater equally is paramount to professional presentation.")

3-, 4-, or more projectors in precision aligned stackers with multi-image animation capability

Soundtrack-synchronized automation system controllin multi-image animation capability

Multi-speaker, multi-channel professional-quality sound system

Multiple motorized zooms

Multiple motorized slews

Full panorama system

Video projector/videocassette deck

Multiple special effects capability, including: rotating image, revealing image, polarizer motion, whole-dome effects.

Sound studio: microphones, mixer, audio tape recorders, amplifier/speakers, noise reduction system as needed, LP/compact disc player, music/sound effects libraries

Visual capabilities: copy stand/camera, slide duplication, masking/alignment capability

LEVEL 5:

LEVEL 4 capabilities, plus:

6-projector all-sky system

Cross-fading panorama projectors

Multiple animation-aligned projectors trained on multiple screen areas

SMPTE (or equivalent) time-code-based automation system

Videodisc player

Pin-registered camera/copy stand

LEVEL 6:

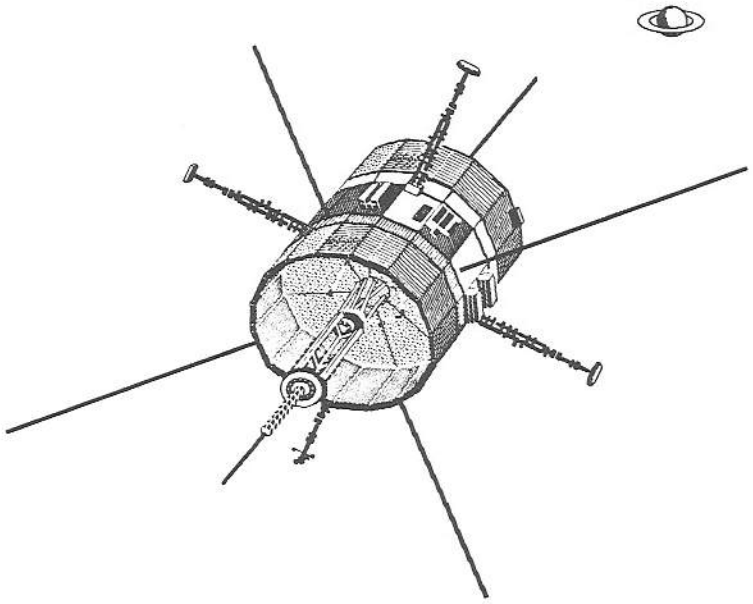
LEVEL 5 capabilites, plus:

Video studio: camera, switcher, editingVCR's and edit controller, monitors, time-base corrector, effects units, etc.

Computer-generated art/graphics system, film recorder, etc.

Digital audio system

Interactive programming capability



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