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**Produced at the Griffith Observatory, Los Angeles, California; http://www.GriffithObs.org/IPSPlanetarian.html**
The Real, Real Constellations of the Zodiac

an update of an earlier article in the Planetarian

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In 1977, Lee Shapiro, then Director of the Abrams Planetarium at Michigan State University, published an article in the Planetarian titled "The Real Constellations of the Zodiac." I felt the article was so important and so useful that it is one of the few I have posted at the Planetarian web site (http://www.GriffithObs.org/IPSPlanetarian.html).

Dr. Shapiro wrote the article to "... give the public further astronomical information that will hopefully have the effect of raising questions about astrological belief and practice." To do this, he points out that the sun passes through 13 constellations, rather than the 12 of traditional astrology, and he asks, "How often have you referred to the twelve constellations that the sun passes through during a year? The number twelve is correct only if one is using astrological constellations. There are thirteen astronomical constellations that cross the ecliptic. Whenever you refer to the zodiac use the number thirteen ... If someone complains that these are not the right constellations, just point out that all constellations are arbitrary and strictly artificial. The ones we use are the official constellations of the International Astronomical Union." Dr. Shapiro provides the actual dates when the sun is in each of the 13 constellations.

Dr. Shapiro further points out that the moon and planets stray above and below the ecliptic and pass through additional constellations. These he calls "the astronomical constellations of the zodiac" (as opposed to the 13 "astronomical constellations of the ecliptic"). He defines the "astronomical constellations of the zodiac" as those which lie in part within eight degrees of the ecliptic. They include the approximate limits of the planets except Pluto, which strays farther and which enters yet additional constellations. As Uranus and Neptune stay very near the ecliptic, this 8° limit would include the constellations visited by all the naked eye planets. His list includes 24 constellations, and is printed as Table 2 in his article.

While writing a guide book to accompany a new astronomy program by Sienna Software, I examined this list to verify it, as I wished to include it in the guide. I discovered that it is incorrect. Dr. Shapiro lists all constellations that lie at least in part within 8° of the ecliptic, but he chose this number only as a reasonable value. It turns out the correct pattern is not this simple.

This article corrects an error published in the Planetarian in 1977, and lists the correct astronomical constellations visited by the naked-eye planets.

Dr. Shapiro was on the mark when he wrote, in 1977, at the conclusion of his article (the italics are mine), "However, there is one caution I would like to mention. If someone asks you whether you believe in astrology, ask them what they mean before you reply. If someone gives me a definition such as "the belief and study of cosmic influences on the earth and its creatures", I can agree that such influences do exist. However, I point out that while it is obvious there are cosmic influences, especially from the sun and the moon, there is no evidence that positions of the heavenly bodies can be used to predict the actions or characteristics of individuals."

When we present astronomical information to the public, we should be diligent to not buy into astrology. The sun passes through 13 constellations, not 12, and the dates when the sun is within the boundaries of an astronomical constellation do not correspond to the dates when it is within the boundaries of an astrological sign. Use the astronomical information. Likewise, the moon and planets pass through yet additional constellations. When Venus is in Scutum, point that out. It causes people to question their assumptions and beliefs.

I used the desktop planetarium program Starry Night by Sienna Software, and double-checked with Voyager II by Carina Software, to find by inspection those constellations which are visited by the planets. I followed the planets forward and backward in time through several thousand years, and discovered that the planets do not pass through three constellations in Dr. Shapiro's 1977 list:

Dr. Shapiro is presently Director of the Morehead Planetarium in Chapel Hill, North Carolina. His article, "The Real Constellations of the Zodiac," appeared in the Planetarian, Vol. 6, #1, Spring 1977.
Possible Origin of the Pawnee Creation Story

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The Adler Planetarium in Chicago is currently developing a planetarium program based on the astronomy of Native Americans, specifically that of the Skidi Pawnee. In addition to the Adler staff, there is a team of consultants including myself, Von Del Chamberlain (former director of Hansen Planetarium in Salt Lake City); Maude Chisolm, a Pawnee elder and one of only a handful of people who still speak the Pawnee language; Pat Leading Fox, the Second, or Vice, Chief of the Skidi Pawnee; Anna Lee Walters, half Pawnee and half Oto; and N. Scott Momaday, Pulitzer Prize-winning author and Kiowa Indian.

Among celestial objects of importance in Skidi astronomy are several constellations which pass very near to the zenith in their native homeland in Nebraska, most notably the Council of Chiefs (Corona Borealis) and Unity (the Pleiades), the Swimming Ducks (part of Scorpions), and Chief Star (Polaris). The Sun, Moon, Venus, Mars and Canopus play important roles in Skidi cosmology.

The Sun and Moon parented the first male, while the offspring of Venus (Bright Star) and Mars (Great Star) became the first male child came first, the eclipse probably preceded the conjunction.

The thought occurred to me that this creation story might refer to a solar eclipse and a close conjunction of Venus and Mars.

female. This “Adam and Eve” became the progenitors of the Skidi people. Canopus, the Death Star or Great South Star, was the place departed souls went after death.

The thought occurred to me that this creation story might refer to a solar eclipse and a close conjunction of Venus and Mars. Details of Skidi cosmology suggest that the eclipse was in the east and the conjunction in the western evening sky, or at least that the two planets began to move close enough together that they knew to watch the pre-dawn skies for the conjunction. Since the male child came first, the eclipse probably preceded the conjunction.

I wondered if one could perhaps correlate this story with actual events in the sky. There are constraints in searching for the proper time frame in which to look. The Pawnee people apparently migrated from the southern USA over many centuries before ending up in Nebraska. Anthropologists first studied the Pawnee people in the late 18th century and most of the astronomical information comes from the late-nineteenth and early twentieth centuries. The best estimates put the Pawnee in Nebraska around AD 1000 or so.

Other constraints come from Earth’s precession. The stories must have originated at a time when there was a good North Star (Chief Star) and the specific constellations mentioned in their astronomy passed near the zenith as seen from Nebraska. As recently as AD 500, Polaris was not the bright star nearest the north celestial pole, and it made an obvious arc throughout the night. Also, Canopus, which they describe as very rarely seen, must have been visible from the southernmost part of their buffalo hunting range, which was Oklahoma or possibly northern Texas. In addition, it is not completely certain that Mars solely represented Great Star.

There is some evidence that Jupiter may have taken that role on occasion. I further constrained my search by somewhat arbitrary assumptions. I assumed that the eclipse must have a magnitude of at least 50% (eclipse magnitude equals ratio of Moon’s apparent diameter to sun’s apparent diameter; magnitude 1.0 or greater signifies a total eclipse). Less than that would not be as dramatic, and much less than that would likely have gone unnoticed. I also assumed the conjunction occurred no more than four months after the eclipse. For a Venus-Mars conjunction, I arbitrarily decided that the separation must be no more than 1°, and 1.5° for a Venus-Jupiter conjunction, except when the other parameters were close to the ideal situation. The angular separation between Venus and the sun must be greater than 6° at the time of conjunction. If one assumes a literally reading of the myth as reflecting actual physical phenomena, then perhaps eclipses that took place before noon and conjunctions that occurred in the western post-sunset sky are stronger candidates.

Armed with these constraints, I used the planetarium program “The Sky,” version 500.004, and started checking for these astronomical phenomena between January 1, 1000 AD and December 31, 1550. “The Sky” includes an eclipse finder which shows the path of totality (or annularity) and the times of beginning, mid-point and end of eclipse, and eclipse magnitude from the selected location, in this case, Omaha, Nebraska. I researched the aspects of every solar eclipse visible from that location. For every eclipse of magnitude 0.5 or greater, I then looked over the next four months for a close conjunction of Venus and Mars or Jupiter, preferably in the western sky.

The ideal set of phenomena might be a total solar eclipse that began after sunrise, followed that evening after sunset with a very close conjunction of Venus and Mars. The closest eclipse-conjunction pair I found matching those criteria occurred on March 10, 1225. The eclipse magnitude was only 0.68, but it began 28 minutes before local noon. Sunset occurred at 18:33 and Venus set at 19:37. At 19:00, Venus and Mars were separated by 43° 22” and occurred with an eastern elongation from the sun of 12° 40’.

I found a number of other such pairs of phenomena that fit the criteria. Most interesting was the period of time from 1225 to 1234 when the two phenomena occurred four times in a span of only nine years, perhaps reinforcing the myth. The table shows the best matches that I found. The first column lists the date of the eclipse, and the second the eclipse magnitude as seen from Omaha. Time of mid-eclipse is when maximum coverage of the sun occurred as seen from Omaha. A “P” following the magnitude means that it was not a total eclipse for any location on Earth. Conjunction date is the date of the conjunction. A “J” under separation means the conjunction was between Venus and Jupiter. Separation between conjunction bodies is rounded to the nearest whole minute of arc. Angle from sun provides the angular separation between Venus and the sun, rounded to the nearest whole degree.

There are many unknowns in the Pawnee archeology. While their creation myth implies that the eclipse occurred in the east with the conjunction in the west, that may...
<table>
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<tr>
<th>ECLIPSE DATE</th>
<th>ECLIPSE MAGNITUDE</th>
<th>TIME OF MID-ECLIPSE</th>
<th>DATE</th>
<th>SEPARATION J FROM SUN</th>
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<td>38', 31°</td>
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<td>20 9', 41°</td>
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<td>Aug 15, 1500</td>
<td>10°, J 23°</td>
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</table>

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Book Reviews

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December is upon us again, and "odometer thinking" is in high gear. As the numbers turn to zeros on the calendar, consider turning the pages of a few good books at the end of this century. Here are some suggestions. And as always, I'm looking for a few good reviewers, willing to exchange a written review for a brand new book. The reviews in this issue all come from contributors on this side of the "Big Ponds." Let's hear from some of our international colleagues!

Our thanks to the reviewers of these books: Anthony Cook, Richard Dreiser, Francine Jackson, John Mosley


Reviewed by Francine Jackson, URI Planetarium and Bryant College, Smithfield, RI, USA

Have you ever seen those cute little books laid out at bookstore cash register counters and wondered how much information is inside those tiny, little things? I recently received Constellations, Glimpses of Infinity in Fact, Myth, and Legend, and was very impressed.

"... we can all use a new and enjoyable star legend"

This book, barely three inches square, contains legends of seven major constellations, plus the Pleiades and The Milky Way. Each sky area's section begins with its "Classical Mythology," that is, the Greco-Roman legends, but then author Sessions introduces myths from all over the world. Orion, according to the Teva people, is Long Sash. Ursa Major is the Aztec puppet who must dance forever around the sky pole. The Estonian Milky Way is the fickle Lindu's bridal veil, flowing from one side of the sky to the other. There is even the beautiful story of Tanabata, Japan's interpretation of Cygnus and Lyra.

In addition, the illustrations by Clare Hemlock are wonderful. Each two-page section introduction shows a stylized version of the star field on one page, with an accompanying picture of the traditional story. Of course, there is a little artistic license; for example, Cygnus is drawn backwards. But, everything is so beautifully drawn - the seven little Kiowa girls dancing on Devil's Tower, the weaver and the farmer, Bacchus's wine goblet - all add to the enjoyment of this precious little book.

So, when you see these little packages, pick them up and look through them. In the case of Constellations, we can all use a new and enjoyable star legend. It may be small, but you can't afford to pass it up.


Review by Anthony Cook, Griffith Observatory, Los Angeles, California, USA

This book breaks a lot of new historical ground, relating for the first time the rise of British amateur astronomy as a movement. Here, "amateur" is used in its fullest sense, as the pursuit of the subject for the love of it, not necessarily denoting a less-than-professional practice. Chapman succeeds in weaving the tales of a large number of familiar names with their more obscure counterparts. The result is a clear image of who practiced astronomy, the relationship and communication between the practitioners, and how these diverse but dedicated amateurs laid the foundation for twentieth century astrophysics and modern amateur astronomy.

Professional (government sponsored) astronomy in England during the first part of the Victorian era was largely concerned with producing ephemerides and catalogues of star and solar system object positions. The well-to-do and servant astronomers were left to take on the cutting edge charting of previously unknown double stars, clusters, and nebulae of the deep sky. The largest telescopes in the world were the giant reflectors of the Herschels, James Nasmyth, William Lassell, and the Third Earl of Rossie with his 72-inch "Leviathan of Parsonstown," unsurpassed in size until the commissioning of the Mt. Wilson 100-inch Hooker telescope in 1917.

"Chapman shows how popular astronomical lectures by famous astronomers, as well as those by self-styled and self-taught speakers, played an important role in educating and entertaining a wide public audience."

In addition to these observers with giant telescopes, influential observers with small instruments; Reverend T. W. Webb and Admiral W. H. Smyth among them, produced the first comprehensive observing handbooks of the sky, the long lived predecessors of today's Burnham's Celestial Handbook.

Chapman shows how popular astronomical lectures by famous astronomers, as well as those by self-styled and self-taught speakers, played an important role in educating and entertaining a wide public audience. It is interesting to read of the lantern slide orreries and other instructional devices used before the development of the planetarium. We also can see how the publication The English Mechanic played somewhat the same role that Scientific American would in the US in the 1920s as the medium for communicating telescope making techniques to a huge and diversified readership.

Astronomers both professional and amateur organized by the 1860s. Chapman relates the rise and fall of the Liverpool Astronomical Society, which eventually became the renowned British Astronomical Association, and how it served as a forum for the most accomplished observers to share insight with and encourage the newcomer. Chapman shows that, unlike the professional Royal Astronomical Society, these less formal organizations did not discriminate against women, and had a substantial number of female members.

This book is scholarly, with nearly one quarter of its contents in the form of footnotes. The text, nevertheless, is very well organized and written with flair. My only negative reaction was to the quality of some
of the reproductions, in which the details - especially in the upper portions of some of the figures - are blurred, perhaps in a scanning process. This lack of fidelity would not have been tolerated a century ago.

For the planetarian, this book can be recommended for several reasons. If history is an important component of your shows, this book will provide background to give added dimension and life to some of its characters. While some of the illustrations were poorly reproduced, their sources are well annotated and can serve as a finder for images. Finally, Chapman has done an excellent job in illustrating several notable careers of women astronomers in the nineteenth and early twentieth centuries. These might otherwise be unfamiliar to us today, and should be welcome additions to the few examples currently available.


Review by: April Whitt, Fernbank Science Center, Atlanta, Georgia, USA.

This children's book may be one for the gift shop buyers. It's set on June 3, 1965, the day of the Gemini 4 space walk, and Tommy and his father have watched the launches, stayed in touch with walkie-talkies during their own space games, and shared all the excitement of the early space program. But on this day, Father has an important meeting at work, and when he comes home they have some trouble reconnecting.

The author/artist's bright, double-page spreads show Tommy and his family from Tommy's point of view. Colander space-helmet fastened firmly in place, he dreams himself into the stars, eager to share his adventures. Tommy's frustration and the ending solution are depicted in facial expressions as well as words.

This book would be an excellent conversation-starter for discussions with children about space travel, about technology, or about handling anger. For teachers and parents of younger children, this is one to recommend.

"This book would be an excellent conversation-starter for discussions with children about space travel, about technology, or about handling anger."


Review by: April Whitt, Fernbank Science Center, Atlanta, Georgia, USA.

These two colorful paper books contain all the pieces a youngster needs to make a mobile of the planets in our solar system or models of lunar exploration vehicles. Pieces punch out and fit together by the tab-A-and-slot-B method. The paper is sturdy, the models fit together well and look quite nice when completed. For students with enough digital dexterity, the models are easy to assemble.

My cautions are in the text portion of the booklets. In the solar system issue, a photograph of a comet is labeled as a "shooting star", the description of a light year leads the reader to think that the solar system is that big, and moon phases are the result of "the amount of sunlight reflected on its surface that changes."

The space machines booklet contains fewer errors. The astronaut information is all about shuttle astronauts, while the models are of a lunar lander and rover, and a space "station." The short summary of planetary explorers at the end of the booklet is very well done.

"These two colorful paper books contain all the pieces a youngster needs to make a mobile of the planets in our solar system or models of lunar exploration vehicles."


Reviewed by Richard Dreiser, The University of Chicago Yerkes Observatory, Williams Bay, Wisconsin

I would not hesitate to recommend _Encyclopedia of the Solar System_ to physics students, serious amateur astronomers, and professional astronomers. Those with little or no science background, however, may find large parts of it difficult to understand.

It is certainly comprehensive: the fifty-six authors, experts all, cover forty chapters, beginning with The Solar System and Its Place in the Galaxy, and ending with Extra-Solar Planets: Searching for Other Planetary Systems. Within can be found nearly all of what we know at present about the solar system, along with some odd omissions (for instance, there is but a single paragraph on "tektites").

"I would not hesitate to recommend _Encyclopedia of the Solar System_ to physics students, serious amateur astronomers, and professional astronomers."

Several topics, The Sun, Venus, Earth, Mars, Comets, Asteroids, and The Solar System, merit more than one chapter apiece (Asteroids, Near-Earth Asteroids). Each was written by a different author, and, this provides the reader with as more information than would be possible were a single chapter devoted to a particular topic.

An excellent Appendix includes sections on Planetary Exploration Missions, Selected Astronomical Constants, Physical and Orbital Properties of the Sun and Planets, and, Physical and Orbital Properties of the Satellites. The details are of course expanded on considerably in earlier chapters, such as Planetary Exploration Missions.

Although not intended for the young readers, this book will yet prove useful to general middle and high school students because it contains good mix of both general information and graduate school physics. One may read and appreciate as much as one wishes (or can understand) about, say, the statistics of comet orbits, and, then skip the section on nongravitational forces (which deals with "radial and transverse nongravitational components by means of a Gauss equation").


There are some editorial errors: captions reversed under plates, sentences placed in the wrong paragraphs, but overall the work will be most useful to the community. My last caveat: One finds in the text the words "See also color insert." These images are hidden.
within four groups-of-four color plates scattered throughout the text. Although captioned, none of the color plates is numbered, and one spends entirely too much time leafing through pages trying to find the appropriate color image.


Review by John Mosley, Griffith Observatory, Los Angeles, California, USA.

This dandy book is one of the finest guides to the sky for the beginning astronomer. A brief section introduces the major components of the sky: planets, comets, eclipses, stars, nebulae, constellations, the Milky Way, and so on, followed by a month-by-month description of what to look for. For each year from 2000 through 2004, it tells you where to find the planets, describes eclipses and meteor showers, and then highlights selected constellations and their major features. For each month, a bit of mythology is followed by concise descriptions of major stars, double stars, and deep space objects that you can see with the unaided eye, binoculars, or small telescopes.

“This dandy book is one of the finest guides to the sky for the beginning astronomer. And it should find a place in every planetarium book store.”

Ian hits the high points without becoming distracted by details, and he hits the mark in interpreting essential information. We learn why stars are certain colors (and what that means), and are guided to easy-to-see double stars and deep space objects. Each is described in a way that is meaningful to a beginner.

Wil Tirion’s star charts are, like all his work, examples of clarity. They show what is important and no more. Each blue-and-white monthly chart is supplemented by several “close-ups” of interesting areas, with an outstretched fist to give scale.

Information is current. Polaris, for example, is described as a variable that stopped pulsating in the 1990s.

One drawback is that the book’s shelf life effectively ends in the year 2004, which will come sooner than we expect. For about 12 pages additional, it could have been useful through 2010.

This slim book would be a useful resource for planetarians looking for ideas during star parties or when writing their own descriptions of the sky. And it should find a place in every planetarium book store.

**Sunclocks: Paper Sundials to Make and Use**, by Jeffrey V. Trionfante, JVT Publications, 5549 Camus Road, Carson City, Nevada, 89701, USA, e-mail gry@jvt.com, 1999, ISBN 1-893812-51-0, $12.95.

Review by April Whitt, Fernbank Science Center, Atlanta, Georgia, USA.

A paper-bound book of sundials to cut out and assemble - what could be a better offering in your planetarium or museum shop? This book provides three types of dials: horizontal, vertical, and equatorial, across nine different latitudes from 26 to 48 degrees north. And that’s only the short-comings I can see - these aren’t printed for southern hemisphere users.

The volume begins with a bit of the history of time-keeping, describes sun-time vs. clock-time, provides a glossary of terms and a list of items needed to complete your paper sundial, and gives directions for longitude correction and orienting each of the types of dials. The cut-and-paste sundials are printed on heavy stock, labeled with their latitudes. The directions are easy to follow and the explanations are clear. The publisher’s web site, at www.jvt.com has more information.

I am recommending Sunclocks as an excellent resource for teachers, summer camp leaders, science clubs and the occasional Y2K worrier.

“A paper-bound book of sundials to cut out and assemble - what could be a better offering in your planetarium or museum shop?”

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Review by April Whitt, Fernbank Science Center, Atlanta, Georgia, USA.

When I first heard about this curriculum for young children, I was intrigued. Students of all age levels visit our planetarium during the year, and developing appropriate programs for our kindergarten and first grade visitors can be a challenge. When I received the three-ring binder of materials, I read it through looking for suggestions and activities. It is an excellent resource for introducing cosmology to our youngest visitors.

The packet of enrichment materials includes two books: The Tree of Life: The

 Origins In The Universe, by Adrian Melott and Gaye Gronlund, ECE Consulting, Inc., 12005 Watermark Court, Indianapolis, Indiana, 46236, USA, e-mail GL.Gronlund@aol.com, 1998.

Reviewed by April Whitt, Fernbank Science Center, Atlanta, Georgia, USA.

In our live “Sky Tonight” planetarium programs on Saturday mornings, urban audiences ooh and aah when the light pollution disappears and the Milky Way stretches across the sky. This collection of Milky Way creation stories from around the world is the perfect resource for the planetarium storyteller.

Some I had heard before, particularly the Kalahari San story of the Girl Who Threw Wood Ashes, and the ancient Greek “spilled milk” tale. But the exuberant Priepriggie of Australia and the Toba Indian story from Argentina of Nagaik, the Path to the Place of Abundance, were new to me.

In all, stories from seven cultures are featured: Japan, Australia, Polynesia, Greece, Native American (Navajo), the Toba of Argentina, and the Khoisan of the African Kalahari. A simple pencil drawing opens each tale, while a glossary and bibliography close the volume.

“This collection of Milky Way creation stories from around the world is the perfect resource for the planetarium storyteller.”

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Vol. 28, No. 4, December 1999

Planetarian

(Please see Reviews on page 20)
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Innovative Controls for Planetariums and Laser Displays
The Dorrance Planetarium in Phoenix, Arizona USA recently hosted Desert Skies, a conjunction of the Pacific, Rocky Mountain, Great Plains, and Southwest Planetarium Associations. Of course, attendance was not limited to these IPS regional affiliates, with guests from other US regionals, Canada, Mexico, Europe, Australia and elsewhere. Even with the beautiful weather and sunshine outside, most of us stayed indoors, under the stars. There were a number of new feature programs to see, loads of vendors, lots of great food, and perhaps the largest concentration of technology ever seen in a US planetarium.

Some conference demonstrations and product highlights:

**Jeri Panek, Evans & Sutherland**

StarRider DXF, DXFI, Digistar II

The StarRider DXF family of products is a relatively inexpensive way to integrate real-time media, sound, and interactivity into your theater. The Digital Effects systems are simply a single “channel” of the E&S StarRider real-time all-dome video system. The DXF systems can be used as a digital media server, supporting a wide range of graphic and video file formats, DVD, audio, and interactivity (in the DXFi).

The DXF architecture allows you to script various events to occur along a timeline and then execute those events in a show following SMPTE timecode or the interactive controls. The DFX/DXFI scripting interface is identical to that of a full-blown StarRider, allowing you to upgrade with a minimum of hassle. The DFXi adds everything you need to create fully interactive presentations with real-time audio and brings you even closer to a full StarRider installation. Both the DFX and DFXi are shipped with a collection of software production tools, and both systems are hosted on the Windows NT platform, running on standard Intel-based hardware. This helps keep the cost down and makes troubleshooting/management much more straightforward.

As an aside, Rob Fisher showcased several interactive sequences developed on the DFXi system – sequences designed for the “Tracking the Human Brain” program under development at the Center for Creative Inquiry at the Carnegie Mellon University. Rob and his team are working on developing meaningful interactive paradigms that work well in a domed theater environment.

I would be remiss if I didn’t mention the E&S Digistar II planetarium instrument. Over the years I’ve seen several Digistar installations, and I must say that the Dorrance planetarium had the brightest, sharpest Digistar II starfield I’ve seen on a 60’ (18.3m) dome. Of course it never hurts to have an E&S engineer tune your projector while he’s attending the conference.

**Scott Huggins, Laser Fantasy International**

**Lumisphere**

LFI is a relative newcomer to hemispherical laser projectors, presenting a sneak peak at their new Lumisphere product. The Lumisphere features the new Cambridge 6210 scanners, providing up to 60K performance from live Pangolin source or ADAT playback. The projection head is a cylinder 10” tall by 5” across, (25cm 13cm) which seems incredibly small for all that it contains. Images are produced with a Coherent Purelight Star C laser, rated at 3.5 watts. Other lasers are available for smaller and larger domes, depending on the brightness needed. In each case, a remote “white light” laser is passed through a Neos controlled PCAOM color modulator and then through a custom fiber launch to the projection head. There are two effects arrays in the projector with four effects in each. This allows pairs of effects to be ganged for additional effects. The Lumisphere has a single electronics enclosure that sits near the projection head. This enclosure contains the scanner drivers, geometry correction, power supplies and effects drivers.

The Lumisphere is an ILDA compatible projector and can run all of LFI’s existing programs. One feature that I found particularly attractive was the ability to run live imagery through the Lumisphere via the LFI lightshow control panels. The unit can be sold individually, in pairs or arrays, or in concert with the Rainbow 3500 lightshow projector.

**Jon Frantz, East Coast Controls Systems**

**ILDA compatible projector**

ECCS gave a demonstration of their low-cost, ILDA compatible laser projector. The system features a white light laser, PCAOM color control, a single Cambridge scan pair, and effects. ECCS recommends choosing a laser based on dome size, and each system can be customized with various options and effects. Air-cooled lasers can be used in small domes (usually up to 40’ or 12m) and water cooled systems are normally needed for larger theaters. This laser projector can present any ILDA compatible program, direct from Pangolin’s Laser Show Designer and other similar packages or ADAT tape.

**Jeff Bowen, Bowen Productions**

Bowen Productions brought one of their AstroFX digital video playback devices. The AstroFX devices store digital video, in either MPEG or MJPEG formats, and are easily integrated into most theater automation systems. Along the same lines, Sky-Skan showcased the DVM2 (Digital Video Machine) from Alcorn-McBride and The Soloist2 from Adtec. Each of these hard disk playback systems function in a very similar manner, though they vary in features and ease of use.

One interesting point of note: The folks from Sky-Skan encoded a clip of video in the MPEG2 format, and stored a copy on a DVM2, a Soloist2, and on a DVD disk. When played back simultaneously from each device, it appeared that the DVD player produced the best image, with finer details and fewer compression artifacts. While DVD may not be a convenient recording medium these days, the quality may be worth investigating.

(For DVD playback, the Pioneer DVD-V7200 was used. This player is also plug-and-play compatible with existing Pioneer laserdisc players.)

In other news, Bowen Productions is now handling duplication and distribution of various slide sets on behalf of IPS. Contact Bowen Productions for more information. www.bowenproductions.com

**Steve Savage, Sky-Skan**

Sky-Skan showcased their all-dome video offering called SkyVision. I had seen SkyVision two times before, but this time the images were more precisely aligned, and
had better color balance across the individual video projectors. One new feature was the use of Barco's recently introduced split-head projectors with separate electronics and CRT/lens enclosures. These new projectors allow Sky-Vision to fit into tighter cove spaces.

Sky-Skan also demonstrated their rather sophisticated Sun/Moon projectors. This pair of video projectors was designed to work alongside a Digistar II planetarium instrument, but they really are multi-purpose controlled motion video projectors with some real-time capabilities. In other words, this pair of projectors can actually display much more than just a flat sun and moon image. In fact, they can display just about any celestial body - be it a star, planet, asteroid, etc.

Finally, Steve Savage was able to show the conference attendees what High Definition video looks like when projected onto the planetarium dome. I can tell you that the crowd was suitably impressed. The clarity and detail of high definition video was really astounding. The first all-dome video system using HD will be in Albuquerque, New Mexico, in the Lodestar planetarium.

Joanne Young, Audio Visual Imagineering

AVI demonstrated their Omniscan 2020 full-dome laser graphics projector. Omniscan is now being used internationally, and is highly regarded as an excellent addition to any theater, even if you don't plan to present laser entertainment programs. Being the "original" hemispheric laser projector, Omniscan sets the standards for performance and functionality, though I think end users will agree that competition is a good thing.

Omniscan currently consists of an 11" (28 cm) sphere housing a pair of 24K Cambridge scanners and two effects wheels. The projection head is fiber fed from a Spectra-Physics Chroma 5 white-light laser. The entire system is ILDA compatible and can be installed in a variety of configurations, with both live and tape playback capabilities.

Long Distance Collaborations using the Internet

One of the interesting workshops held at the conference discussed how to develop collaborative planetarium shows via the Internet. Aaron McEuen from Hansen planetarium, and Tony Butterfield from the Burke Baker Planetarium at the Houston Museum of Natural History have been working together on remote production projects for a few years now. They use a combination of shared websites, secure servers, and digital images/audio/video. All of the production assets, scripts, and deadlines are shared and can be accessed by all those involved.

Using this same technology, it is possible to offer an online preview of shows and other media that are available for purchase or projects that are under construction. In fact, Mr. Butterfield has developed a streaming media version of some of his productions, allowing you to watch a planetarium show online.

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**ANSWER:** Most TV stations air ‘STAR GAZER’ just before nightly sign-off. However, due to ‘STAR GAZER’s’ enormous popularity a number of stations find the show’s 5-minute format can fit anywhere during the broadcast day and air the show more frequently. Local TV listings seldom include 5-minute shows, so it’s best to call the station for the broadcast schedule.

**QUESTION:** If I can’t find ‘STAR GAZER’ on my hometown PBS station, how can I see it where I live?

**ANSWER:** ‘STAR GAZER’ is provided free of charge by WPBT, Miami to all PBS stations. If you can’t find it, write or call your local PBS station and ask if they will air it and remind them that it is available free of charge.

**QUESTION:** Is it necessary to get special permission to use ‘STAR GAZER’ for astronomy club meetings, teaching in the classroom, science museum or planetarium use?

**ANSWER:** No. In fact, many astronomy clubs, teachers, science museums and planetariums have been taping ‘STAR GAZER’ off the air and using it regularly as a way to reach their public.

**QUESTION:** Is there any way I can get ‘STAR GAZER’ other than my local PBS station?

**ANSWER:** Yes. A month’s worth of ‘STAR GAZER’ episodes are fed monthly to a satellite from which all PBS stations take it for their local programming. Anyone with a satellite dish is welcome to the satellite feed. Again, no permission is required. For satellite feed dates and times call Monday through Friday (Eastern time) 305-854-4244. Ask for Ms. Harper or Mr. Dishong.

**QUESTION:** I am a teacher planning my curriculum and would like several ‘STAR GAZER’ episodes in advance, but I do not have access to a satellite dish. Is there any other way I can obtain ‘STAR GAZER’?

**ANSWER:** Any teacher anywhere around the world can obtain ‘STAR GAZER’ episodes in advance through their NASA C.O.R.E. Teachers’ Resource Center. For details write:NASA C.O.R.E.; Lorain County Joint Vocational School; 15181 Route 58 South; Oberlin, OH. 44074. Or visit our website: www.jackstargazer.com

**QUESTION:** Why does ‘STAR GAZER’ always say “Keep Looking Up!” at the end of each show?

**ANSWER:** Have you ever tried star gazing looking down?

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A planetarium is a spectacle, an event, but above all a tool which provides amusement in the service of knowledge. To meet all these needs, RS AUTOMATION INDUSTRIE, thanks to its specialization in automation, has developed a complete range of planetariums, all designed to provide a specific and immediately operational solution.
Terence Murtagh will now be heading Evans & Sutherland's Digital Theater Division. Former Digital Theater Division General Manager, Stanley Walker, will continue with the company in a consulting role. Kirk Johnson, former Product Manager, is the new Deputy General Manager.

After 32 years, Larry Schindler has retired as the Director of the Charles Hayden Planetarium in Boston. Dorothy Crawford (Producer at the Charles Hayden) wrote, "We miss him already and he's only been gone 3 weeks."

Charles Hemann (from the University of Arkansas at Little Rock) is the new Planetarium Director at Andrews Independent School District in Andrews, Texas!

Bess Amaral has retired from the Goddard Planetarium, (Roswell, New Mexico) and moved to Dallas, where she is a science and math teacher for the Polk Middle School in Carrollton, Texas. She plans to continue working in planetaria in the future.

Rovy F. Branon reports that after eight years at the Kelly Planetarium at Discovery Place in Charlotte, North Carolina, he has received a fantastic opportunity to continue his education by attending Indiana University in Bloomington to work on his Ph.D. in Instructional Systems Technology.

Did you Know

There were many eclipse chasers in Europe last August, including several of our fellow planetarians. Many were on cruise ships. Jim Manning (Director, Taylor Planetarium, Museum of the Rockies, Bozeman Montana) and Shawn Laatsch (IPS Treasurer and Director, Arthur Storer Planetarium, Prince Frederick, Maryland) were on the Marco Polo, and Dennis Simopoulos (Eugene Planetarium, Athens, Greece), Ed Krupp (Director, Griffith Observatory, Los Angeles, California), Paul Knappenberger (President, Adler Planetarium, Chicago, Illinois), and Jon Elver (Planetarium Director, Lane ESD Planetarium, Eugene, Oregon) were all on the Stella Solaris. Thomas W. Kraupe (ARTofSKY) had a phone conversation with Jon on the ship just minutes after they had totality in Munich, right before the Stella Solaris was in the eclipse. Thomas said that while many folks were clouded out, the Deutsches Museum Planetarium and Observatory had a great eclipse party, witnessing totality and having four cameras online for a live webcast. Thomas estimates this eclipse was the biggest eclipse event in the history of mankind with 1 billion people in the shadow of the moon (penumbra). Jan Silfer (Head of the Technical department, Observatory and Planetarium of Prague) placed eclipse images from Prague, an airplane in Austria, and from a mobile ground unit online, at www.planetarium.cz.

Mark and Carolyn Collins Petersen (Loch Ness Productions) saw the eclipse from a plaza in Garching, slightly north of Munich. While they were in Germany they also visited the Deutches Museum and the Forum der Technik in Munich.

The LodeStar astronomy center will be opening soon! It is an addition to the New Mexico Museum of Natural History & Science (Albuquerque, New Mexico). The center will include a planetarium, observatory, exhibit galleries and motion simulator. The planetarium will have a titled, 55-foot screen with about 150 seats, equipped with Digistar II and the first high-definition SkyVision all-dome video system. The galleries total 6,000 square feet. The observatory, which will be linked to the planetarium, includes a 16-inch (41 cm) Schmidt-Cassegrain telescope. LodeStar entered into a joint powers agreement with the New Mexico Museum of Natural History & Science to create the cooperative partnership.

A planetarian assisted police in solving an 18-year-old robbery. The stolen item was a 8-inch (20 cm) lens for a Alvin Clark and Sons telescope built in the 1880s. The telescope is owned by the Cincinnati Astronomical Society. In 1981, someone stole the lens, leaving behind a useless telescope. A society member heard of a new telescope being built by a professor at Roane State Community College in Tennessee. The lens was being built around an 8-inch Clark lens just like the one that was stolen. The professor had written an article about how he acquired it. Jeff Gull (formerly of the Gibbes Planetarium in Columbia, South Carolina) spotted the fraud and alerted Bob Araial, a noted Clark restoration expert, who in turn reported this individual to the police. The lens was brought back and marks matched up between the lens and the telescope. Physics Professor Robert Thomas has been indicted for receiving stolen property. He was a society member when the lens disappeared 18 years ago.

I've enjoyed writing the Gibbous Gazette column for several years, and I thank all of you who have helped by sending me information and stories. However, my schedule will no longer permit me to write it. All those interested should contact the Planetarian's editor, John Mosley. If you have any questions about Gibbous, please give me a call. - Christine Shupla
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After and careful deliberation, a proposal was made to the IPS council for a handbook that I feel will be useful to the portable planetarium community. Plans are still being worked out and it will probably be a year before all the materials are collected and compiled into a user-friendly medium. Following is a rough draft of a table of contents. Please study it and give me some comments. I would like it to be valuable to all planetarians. Can you help?

1. Introduction and Credits
   Purpose of the handbook and list of contributors
2. Table of Contents
3. Portables Currently on the Market
   Describe them
   User comments-Likes/dislikes-consumer report
4. Vendor Videos:
   This is how the planetarium looks in the boxes/bags/in a car.
   Projector: Open the case- any special hinges etc. Remove items in the box-display and name them and explain what they are used for.
   Go over the projector parts, operation and add-ons (if they exist) such as cylinders, sun, moons, planets and how to attach them to the projector.
   Position projector for set-up, open fan and position dome, demonstrate inflation procedure and centering projector in the dome, and then deflation, pack up, upkeep and repair of equipment.

Show support materials-operator's manual, lesson plans, pre/post materials.
5. Scriptwriting for Portables-How to do it
6. Advertising and scheduling
   Samples of brochures and other advertising used
   Letters - to clients to set up scheduling
   Letters - instructions to teachers etc.
7. Lessons/Shows
   We will gather quality audiotapes of presentations given about specific topics such as:
   Primary Level Program, Seasons, Moon, Celestial Motion, Mythology, Planets, Navigation and so on. The contributing presenter must include the following information along with the tape:
   Source of lesson (original or adapted from...)
   Goals and Objectives
   List of equipment/materials needed
   Show a correlation with National or State science standards
   Specialized Vocabulary
   Briefly explain sequence of lesson elements
   List of Pre/Post activities that can be used with this lesson
   The evaluation form used after the lesson
   A signed release form
8. Outreach without the specialist
   Ideas for training teachers to use a portable.
9. Sources
   List of sources for lessons, pre/post activities plus table of contents of these publications, commercial shows available for portables, GLPA Tips #18, also mention IPS and Affiliate meetings where workshops are usually given for portables, and how to hold your own PIPS meeting.

American in Italy Contest 1999:
Remember it is never too early to apply for this wonderful experience!
A week in the north of Italy: Each year Serafino Zani Astronomical Observatory (Lumezzane/Brescia), in collaboration with the IPS Mobile Planetarium Committee and with the support of Learning Technologies, Inc., hosts an American Planetarium Operator who presents lessons in English with the itinerant planetarium Starlab to high school students of English. Transportation from the United States will be provided, along with bed and some meals from Monday to Sunday. If you would like more details and/or an application write or call: Susan Reynolds Button, OCM BOCES Planetarium, PO Box 4754, Syracuse, NY 13221, Phone: 315-433-2671, fax: 315-432-4523, e-mail: sreynold@cnyric.org

April Whitt is preparing to fly to Italy as I write this. We look forward to reading a report of her adventure. If you know of a qualified and talented individual who resides in the USA, works with Starlab, and would like more details about how to apply for this special experience in Italy next year, please advise them to write or call me.

This contest has proven to be an extraordinary success for both countries. Other planetarians can use this initiative as a model and start their own cross-cultural sharing. Contact Loris Ramponi or me and we will discuss how we set it up.

Another Way to Collaborate:
Loris Ramponi (Centro Studi e Ricerche Serafino Zani, Via Bosca, 24-C.P. 104, 25066 Lumezzane G. (Bs) Italy Phone: 030/871861 Fax: 030/872545) is conducting a contest with students and is seeking foreign partners and colleagues interested in organizing a similar contest or simply promoting, for teaching purposes, "Constellation Inventors" among students. The contest involves inviting students to invent new constellations using the positions of the main stars of a constellation. The best drawings are transformed into postcards to send to relatives and friends. Each postcard contains the name of the artist's drawing and a fixed message that suggests sending money to a national non-profit organization involved in scientific research (i.e. The Cancer Society). He writes, "I think that this activity can help students to learn that constellations are only a result of ancient's imagination and mythology and not a window to know our future!" Please contact him to become partners in educating students and connecting across cultures.

PIPS Meetings:
The next Powerful Interactive Planetarium Systems (PIPS) meeting will be held in Boston at the factory of Learning Technologies, Inc., on 19 November 1999. I thrive on these days of sharing, as do others, and gain new friends and techniques at every get-together. Why don't more of you try having a PIPS meeting and report the minutes to the rest of us? Contact me for details.

Standards:
Steve Tomacek, Science Plus Inc., has compiled a document which demonstrates how each lesson in the Learning Technologies, Inc. (LTI) Astronomy and More book aligns with National Research Center (NRC) standards. Each LTI sales representative will tie in their state standards as they are developed. This document can be acquired from LTI.
GLPA 1999 Workshops:

Just as in years past, the members of the GLPA regional affiliate will present a wide array of workshops dedicated to the portable planetarium educator. Listed below are this year's treats:

"Story-telling and Sky Observations in the Far North: Eskimo Astronomy and Mythology" Jeanne Bishop (Westlake Schools Planetarium, Westlake, Ohio; E-mail: JeanBishop@aol.com)

At high latitudes seasons are radically different from what we experience in mid-latitudes. The sun prevents sky observations during summer, and a dark sky (the polar night) appears without break for many months. This cycle leads to interesting cultural activities and psychological changes. Further, the harsh life is reflected in the Eskimo names will be identified, and some anecdotes and Eskimo sky myths will be told.

"Measuring the Brightness of Stars" Susan Reynolds Button (OCM BOCES M-S-T Center, Syracuse, New York; E-mail: sreynold@cnyrinc.org)

During this workshop we will examine adaptations of a PASS program where students observe the relative brightness of stars and discover that there are more dim stars than bright stars. They then invent their own systems to classify stars according to their brightnesses. They compare their systems and decide on a "standard classification system." Finally, they learn more about the international star brightness classification system developed by astronomers. We will develop strategies for effectively presenting this activity in your planetarium.

"Getting There From Here" Gene Zajac (Shaker Heights High School Shaker Heights, Ohio; E-mail: starman224@webtv.net)

Planning a trip to a planet involves a few problems. Gravity is both an enemy and a helpful friend. Learning to travel in space requires creativity and planning. We will discuss the issues of escape velocity from a planet and the sun. The force of gravity will take its toll on our initial velocity even when traveling to the moon. Using the gravity of a space body to slow a craft down or increase the speed is an inexpensive method used in space travel. Simplifying this concept is one of the purposes to this activity.

"Location, Location, Location" Barbara Nissen (OCM BOCES M-S-T Center, Syracuse, New York; E-mail: bnissen@cnyrinc.org)

By the year 2000, all students in America will leave grades 4, 8, and 12 with the ability to demonstrate competency in challenging subject matter including geography and science. Elementary teachers must teach across the curriculum to meet demands of GOALS 2000: Educate America Act passed in 1994. This lesson will combine geography and science in the portable planetarium. Elementary students practice using latitude and longitude to locate landforms and regions of the world. The use of a grid system to locate points on Earth transfers to the celestial sphere renamed altitude and azimuth to locate points in space. Students practice locating stars.

"Dayton Daily News" Cheri Adams (Caryl D. Phillips Space Theater, Boonshoft Museum of Discovery, Dayton, OH 45414; E-mail: damuseum@gte.com)

Astrolabes have been used for more than 2,000 years and students of today still love learning how to use them. If the construction is simple and expenses minimal to produce these, then this becomes a wonderful project. Students construct their own astrolabe, bringing it to the planetarium for a demonstration of the instrument and continue to record their observations from the real sky for a designated length of time.

"Special Effects/Gadgets Demonstrations" Susan Reynolds Button will demonstrate a new "Solar System and Galactic cylinder", designed by Murray Barber from the United Kingdom. Chuck Beuter and/or Doris Forror plan to contribute a demonstration (to be announced). All others will be welcomed to use the dome to demonstrate their latest creations and tips.

Braille Book Review: July-August 1999, Books for Children-Nonfiction:

While surfing the net one day I ran across a site for Braille books and a book was listed under astronomy,

"Close Encounters: Exploring the Universe with the Hubble Space Telescope" RR 11749, by Elaine Scott, 1 volume. The review said: "Explains how information transmitted by the repaired Hubble telescope enables scientists to study stars, planets, black holes, and galaxies. Describes the impact of this new technology on astronomers' ideas about how the universe was formed. For grades 4-7, 1998." This might be worth looking at.

Correspondence:

La'Kesha Spruill (515 Dowd Street, Durham, NC 27701; Phone: 919-956-5599) called to ask for some materials from the Public Domain Files. She said she was going to teach 8 classes a day for two schools K-4 and sees all students once a week! I thought that it was wonderful that she could see students every week but eight classes was rather excessive and I warned her to beware of fatigue. She wrote to thank me for the materials and said, "I have reconsidered seven to eight classes a day. I am presently teaching six classes a day (except on Tuesday, I see seven classes). You were right, teaching Starlab is a very rewarding and exhausting experience. But I enjoy it very much."

Nick Platco (PO Box 224, St. Peter's, PA 19470 e-mail: Starman224@webtv.net) wrote to say that he is doing a dissertation on Starlab and interactive lessons versus lectures and asked if I knew of any other dissertations than 1980 Gerald Mallon Dissertation? If you can help, please contact him.

Signing Off:

Happy Holidays! I wish you good health and success in the New Year.

(Reviews, continued from page 11.)

Wonders of Evolution, by Ellen Jackson (ISBN 0-87975-819-8 from Prometheus Books, 59 John Glenn Drive, Buffalo, New York, 14228-2197) and a comb-bound How We Happened: The Beginning of Everything by the authors of the curriculum. Both are meant to be read aloud to young children. Colorful illustrations complement the texts.

The lesson plans, sample letters for parents, activities, and resource suggestions are well-written and well-organized. The learning styles of young children are emphasized throughout.

"It is an excellent resource for introducing cosmology to our youngest visitors,"

But the materials are not for kindergarten teachers only. The authors have included a section for fourth and fifth graders, as well as first through third, making this packet one that science centers, museums and schools can use with a variety of age ranges. For those of us who can still use the word "evolution" in our teaching, this packet is a resource worth purchasing.

Planetary Vol. 28, No. 4, December 1999
NEW!
Millennium Mysteries
Written by Adler Planetarium historian, Dr. Marvin Bolt, this new sky show traces the evolution of our modern calendar through various cultures and astronomical intricacies. Millennium Mysteries features computer animation and an original score composed and performed by Richard Woodbury.
32 minutes / over 200 slides / $495 with laser disc / $495 without laser disc

Clouds of Fire: The Origin of Stars
Exploring the interconnection of all matter in the universe, this sky show presents an overview of star formation and the modern instruments which help us gain a clearer picture of stellar life cycles.
33 minutes / 266 slides / $1150 with laser disc / $895 without laser disc

In Search of New Worlds
Posing the age-old question of “Are we alone in the Universe?” this show utilizes special effects, computer animations and interviews with planet hunter Geoff Marcy to offer a comprehensive look at the search for planets beyond our own solar system.
33 minutes / 217 slides / $795 with laser disc / $695 without laser disc

Is There Life on Mars?
Diving into the startling discovery of a meteorite, presumably from Mars, which may contain the evidence of microscopic organisms, Is There Life on Mars? spotlights past, present and future exploration of the mysterious red planet and includes interviews with Mars experts.
35 minutes / 245 slides / $595 with laser disc / $495 without laser disc

Seeing The Invisible Universe
Narrated by Bill Kurtis, host of the successful PBS series “The New Explorers,” this sky show explores the amazing discoveries in wavelengths beyond the range of human perception. Highlighting the Gamma Ray Observatory, the show features interviews and computer animations.
33 minutes / 232 slides / $595 with laser disc / $495 without laser disc

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Forum

Steve Tidey
Maryvale Schools
Planetarium
1050 Maryvale Drive
Buffalo, New York, 14225

Greetings, earthlings.

Y2K is lurking around the corner like ... well, a big lurking thing. Yes, a new millennium approacheth, and at times like this one is tempted to look back and reflect. So with that in mind I thought it would be useful to give this issue of Forum over to a retrospective of the planetarium profession in the 20th century. Here's the topic:

Retro:spec tive's on the 20th century are in vogue at the moment, what with a new millennium lurking around the corner. Looking back over the 76-year history of the planetarium profession, what do you think have been its more significant successes and failures? If you could time travel, what event or moment in that history would you like to have been involved with or simply witness?

Dennis Mamanna drops the puck to get us going.

***

What a marvelous experience it must have been to enter the 9.8-meter (32-foot) dome in the Deutsches Museum on October 21, 1923. At its center was a strange, mechanical-looking device aimed upward toward the sky. No one had ever seen anything like this before and, as the spectators excitedly took their seats, they must surely have wondered what was about to happen to them.

And then, the lights dimmed.

And the stars came out.

In the daytime!

Oh, what a thrill it must have been to witness the spectacle: the world's first indoor universe. The effect was so startling, they say, that even the men who designed it were astonished. Newspapers called it the "wonder of Jena".

And it must have been absolutely spine tingling.

Unfortunately, I was nowhere around on that exhilarating October day in 1923 - my parents were only 10 at the time. But I do remember fondly my first visits to New York's Hayden Planetarium and Philadelphia's Fels Planetarium, as a child in the late '50s and early '60s. And I'll bet my experiences there were much the same as those of the lucky few in Munich four decades earlier.

Today, as we prepare to cross the threshold into an exciting new century and millennium, we gaze toward a future bright with promise. Yet, at the same time, we cannot help but look back from where we've come. Since that magical day in 1923, our knowledge of the cosmos has advanced beyond anyone's ability to grasp. We've learned about galaxies and quasars and black holes, and about a universe that seems expanding and limitless. We've sent robot ships to visit many of our neighboring worlds, and have even watched a dozen humans walk the soil of one of them. We've peered outward in colors that, until recently, no one had ever seen. And we've developed computing machines to gather and reduce data at an alarming rate.

Things have become bigger and faster and far more complicated than ever before. And, like the cosmos itself, there seems to be no end in sight.

We in the planetarium profession - and those in our audiences - are the beneficiaries of these astonishing advances. We now have at our disposal planetarium instruments that are truly time and space machines, and they rival the real sky in appearance. We have in our arsenal computers and fiber optics and lasers and video that can turn our domes into virtual spaceships of the imagination.

And we don't hesitate to use every bit of our electronics we can get our hands on. Over the past three decades, our shows have mirrored this technology, becoming bigger and faster and far more complicated than ever before.

We argue that this is necessary because we're competing for the same dollars with whiz-bang, high-budget motion video games and virtual reality; that we need to keep up or we'll be left behind in the dust of the 20th century. And we rationalize that this is what our visitors want and that, without it, their numbers will dwindle.

But, if I may borrow a from the turn of the last century - we've somehow allowed the cart in front of the horse. We've become so drunk on our technology, that we've lost sight of the purpose of a planetarium: to demonstrate the beauty and wonder of the night-time sky.

Or, as Dr. Walter Bauersfeld (whose "wonder of Jena" stunned the crowds in 1923) so eloquently described it: to "create the illusion of the mysterious, silent march of the worlds of nature."

Now I'm not for a moment suggesting that we abandon technology in favor of stuffy, old-fashioned lectures under the stars. By all means, let's use it to blow peoples' minds. But not just because we've got a new special effect gizmo that we want to show off.

Where we make our mistake, I believe, is in trying to compete with the multi-billion dollar entertainment industry on their level. We cannot now achieve, and may never be able to achieve, what they do. But then, they can't do what we do: create a realistic and spine-tingling night-time sky.

And that, my friends, is our strength for, you see, astronomy is the only field of science where the entire laboratory is right outside our back door. A planetarium can use the sky as a bridge - between those making the most remarkable discoveries of our day, and the average person who believes that these are far beyond his or her comprehension.

Years ago, my then-wife was studying Astronomy 101 so she could fulfill her science requirement for a teaching degree. She really did quite well, passing all her exams with nothing less than an A. She could recite rhyme and verse about how the universe expands, how spectroscopy tells us the chemical and physical makeup of the cosmos, and how stars evolve over time.

One evening, she was impressing me with her newly acquired knowledge of red giant stars, when I happened to mention Betelgeuse. Her perplexed look stunned me, but not nearly as much as her question: "You mean ... you can see a red giant?!?"

When we went outdoors and I pointed to the shoulder of Orion, her chin dropped in amazement. Suddenly, astronomy became real. It became understandable. It became accessible. And on that night, she made a wonderful new friend in the heavens.

It's this crucial bridge that many planetariums have been missing in recent years - the link between the excitement and mystery of modern astronomy and the sky above our heads. And, to create that bridge, it isn't difficult. We must only back off the technology a bit, and refocus our attention on our true purpose.

Now, what if we refuse to compete with the bigger and faster and more complicated of the entertainment industry? Will our visitor numbers dwindle? Perhaps at first. But, I believe that, in this ever-more rapid-paced and complicated world, the simplicity and beauty of the night sky will eventually win out.

Because it's equally true today as it was in 1923: an indoor universe is quite a novelty!

Dennis L. Mamanna
Reuben H. Fleet Space Theater
Beyond that, I’ll pass on “rolling diurnal in reverse”. Simply put, when it comes to planetaria, I don’t feel there have been too many “golden era” events or moments I’ve missed out on. I’ve seen Strasenburgh shows in the era of Don and Fran and Vic and Elmer. I enjoyed the original Laserium, with Ivan’s narration, and I’ve seen “Tank” performed live with note-per-note precision and artistry. I’ve heard Jim Sharp hold audiences enthralled with simple star talks. I’ve performed keyboards live in planetarium concerts with AVI lasers overhead. I’ve seen Digistar when it was a still a CRT tube sitting on the conference room table at Evans & Sutherland. I’ve seen thousands of shows in hundreds of theaters around the world – big and small, good and bad – and through my everyday work, I contribute to those thousands.

I’d rather use a time travel opportunity to visit the future instead, to see that virtual dome in Hong Kong that Arthur C. Clarke wrote about, to visit the HoloSphere that works like the Enterprise’s Stellar Cartography suite in the Star Trek movies. But that’s only a couple of decades away, and I plan on still being around then.

Hmmm, maybe we’d better set that time machine 76 years into the future instead of the past. What do I see? The HoloProjector, home model. You select Planetarium as the program to load, and in a silent concussion of light, a virtual dome surrounds you. Fortunately for us “content providers” (to use the 90s term), the sound, images and such you’ll take in will be our domain.

As long as we can hold your attention for a while, and inspire you to wonder, we’ll have succeeded in our evolved role of planetarian, storyteller of the stars.

Mark C. Petersen
Loch Ness Productions
PO Box 1159
Groton, Massachusetts 01450

The planetarium field’s successes can number among the following: it is the best, and in some cases the only, venue for the teaching of astronomy and space science; it has brought together one of the most creative and eclectic mixes of people within one specialty; and it has been a leader in science education for the general public. No other science has such an open door policy as a part of its discipline for expanding the awareness and understanding of developments in the field.

Probably its biggest failure has been the interdependence of most facilities as either a museum department or an expensively equipped classroom, resulting in a lower status than it deserves. However, the independent contractors, the portable planetarians, are showing educators that the planetarium facility can, indeed, stand on its own.

If I could travel back in time, my first stop would be 65 million years ago, to once and for all find out the real story. And, of course, if that weren’t possible, ditto 1906. After all, speculation can only satisfy for so long.

Francine Jackson
Planetarium Curator
University of Rhode Island
Physics Department
Kingston, Rhode Island 02881

I speak also for others Italian colleagues when I say that the most significant success is simply the invention of the modern planetarium, that allows us to reproduce under a dome time and space travels toward the celestial skies of each epoch and of each point on the planet. After 76 years the main use for small and big domes in our country is the classic use of the planetarium - spherical astronomy. A planetarium continues to be the best teaching instrument to make astronomy interesting for every kind of public.

Probably the success moments of planetaria for the public were the years of the first human space missions and of the Apollo missions, when sky domes became one of the most attractive sites even for common visitors. Can we hope for a similar success for a future first human mission on Mars?

In my opinion it is difficult to speak about the technical improvements in the planetarium field without signaling, directly or indirectly, producer names. Therefore I do prefer to remember two important “inventions” with many “fathers”:

1) The introduction into the market of small and cheap planetarium models, fixed or itinerants, available for schools and small communities, that brought the stars to the public in every country and in every city.
2) The solutions and the projects to make planetaria accessible for handicapped people.

In conclusion, concerning the question about the more significant success

1) The more significant success is the realistic artificial skies created through the best star projectors of the last generation.
2) The significant failure is when planetarium use is so far from its original function and, in particular, when during a planetarium session the public can see the sky only for few minutes.

Loris Ramponi
Serafino Zani Observatory and
Planetarium Via Bocca 24
25066 Lumezzane (Brescia)
Italy
Vol. 28, No. 4, December 1999

**James Wright 1931 - 1999**

James Frederick Wright passed away at home on Monday, July 26, 1999. Jim was born in Calgary on February 3, 1931. After graduating from Crescent Heights High School, Jim attended Mount Royal College, SAIT, and the University of Calgary. He was a member of the Calgary Amateur Radio Association and was a founding member of the Royal Astronomical Society of Canada Calgary Centre, receiving the service medal from the R.A.S.C. in 1967. Jim was instrumental in the Calgary Centennial Planetarium Project and was involved in the establishment of the H.R. MacMillan Planetarium in Vancouver, 1967 to 1988. After retiring, Jim returned to the Calgary area where he enjoyed pursuing his many interests, culminating in the completion of his workshop.

When Jim's family and friends gathered for his memorial service on Saturday, July 31, 1999 Bob Nelson, the Chief Technician (ret.) of the Centennial Planetarium, captured Jim's friendliness and quiet, mischievous good humor in a moving eulogy. Bob recalled delightful stories of adventures in Europe and East Germany at the time the Centennial Planetarium's Zeiss projector was purchased and a wonderful incident where Jim kept the City from putting a street light in the sight-line of his observatory by moving a survey peg in the dark of night.

***

So, there you have it. Like it or lump it, that was the 20th century. It played to mixed reviews, but only time will tell if, as Arthur C. Clarke believes, in several thousand years this century will be remembered primarily (if not only) for the Apollo Moon landings.

***

My fellow Buffalonian, Paul Krupinski, sent in a contribution for the Forum topic in the last issue. Unfortunately it arrived too late to be included, but I wanted his words to be read as they are inspirational and should give a boost to your day. The topic was:

**What is the best thing about being a planetarian, and what is the worst?**

***

Allow me to tackle the last question first. I cannot think of one negative thing about being a planetarian. Moving along to the next question, What's the best thing about being a planetarian? Being a planetarian is the best job in the entire universe! Where else could you inspire inquisitive minds, unlock the mysteries of our universe, and yet receive an ovation at the end of the program? And they call this work?

As a kid I always wanted to do something that I really enjoyed. Now, if someone could pay me for what I loved to do ... who could ask for anything more than that? Imagine, I went to State University of New York College at Buffalo (Buffalo State College) exclusively because they had a planetarium in the basement of the Science building! After graduating with a Masters in Science Education and a minor degree in Astronomy, I decided to pursue my ultimate childhood dream; working in a professional world renowned planetarium. Dreams do come true ... I currently present school shows, as well as public programs at the famous Strasenburgh Planetarium, Rochester, New York. Being a planetarian is outstanding.

Another great asset about being a planetarian is the ability to work in the greatest room ever invented - the planetarium. I loved the capabilities of this unique classroom so much I bought one. Not only do I present programs in a large theater, but I travel to numerous schools in the Buffalo/Rochester area in my portable planetarium. Owning a planetarium allows me to present nearly 500 shows a year under both large and small domes. Where else could you inspire, educate, entertain, sing, laugh, tell stories, use models/multi-media and lasers, discuss the fate of the universe, and yet learn something about yourself, as well as the cosmos in which you live? Only in a planetarium!

As planetarians, you work in the coolest room and you do have the best job in the entire world. Stop and think someday ... how many minds have you touched or changed even in the slightest? Keep up the excellent work, and may all your hopes and dreams carry you to the end of every rainbow ... and beyond into the stars.

Paul J. Krupinski
Director, Mobile Dome Planetarium
Buffalo, New York

***

Here is the topic for the next Forum:

**What are (or should be) the planetarian's ten commandments?**

These can be funny or serious, or a mixture of the two. Don't worry if you can think of only a few, just send me any you can think of. I'll be pleased to receive the results of your considered thoughts by the deadline of January 15.

I'll see you all in the next century.
Mars Polar Lander Participation Certificate

Presented to

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Thank you for participating in this historic event. The Mars Polar Lander and future missions to Mars will help us unravel many of the mysteries surrounding the "Red Planet." One day we hope to send space explorers to Mars and beyond. You could be that future explorer, but only if you stay in school and study hard, especially in the areas of math, science, and computer technology.

Remember to keep your eyes on the skies because your name is now part of the cosmos!

[Signature]

Dr. Wesley P. Huntress, Associate Administrator
Office of Space Science

NASA

A new Planetarium de Montpellier is presently being built. A very large planetarium is also announced for near Bordeaux.

This summer, Jean Méades passed away on 9 August. He was the importer of Spitz and Goto Planetariums and had installed the projectors and domes of the Planetariums of Strasbourg (1981), Musée de l'Air et de l'Espace at Le Bourget (1984), Cité des Sciences at La Villette (1986), and Espace Mendes France at Poitiers (1992).

**Great Lakes Planetarium Association**

**Illinois:** October brought a universe of change to Chicago’s Adler Planetarium & Astronomy Museum, including two new shows and extensive renovations and remodeling. Beginning 1 October, visitors enter the Planetarium via the grand staircase and the prism doors, the original entrance to the building.

Upon entering, visitors now see the museum store the Infinity Shop to the left. To the right is the entrance to the exhibits, including a new exhibit entitled Gateway to the Universe. Reopened in its new permanent home on the Lower Level of the 1930s building is The Universe in Your Hands, the showcase of Adler’s history of astronomy collection. The original Sky Theater, with its Zeiss Mark VI star projector, reopened at the same time with a full schedule of shows. The theater has been refurbished with new carpeting and approximately 300 stackable, portable seats replacing the older theater seats. Adler has also upgraded their existing Spice automation to include all of their dissolve, panorama, and all-sky systems. *Millennium Mysteries,* a new show for the newly remodeled Sky Theater, will explore various aspects of the concept of a millennium, including its origins. The next StarRider show, *Blueprint for a Red Planet,* is part of Adler’s effort to support the Mars Millennium Project, a nationwide educational effort, and it is the first StarRider show fully produced by the Adler Planetarium. This space saga will “transport” viewers to Mars to see what it’s like to be an interplanetary pioneer in the year 2030.

The Cernan Earth and Space Center on the campus of Triton College in River Grove recently premiered an all-new, state-of-the-art laser projection system, custom built by Aura Technologies of Chicago. In early fall, the Cernan Center installed a set of remote laser projectors and fog machine in front of the dome that will direct laser beams over the heads of the audience, resulting in an even more spectacular laser show experience.

The William M. Staerkel Planetarium at Parkland College in Champaign premiered *Destination Mars!* this fall, to be followed by four more programs. Led Zeppelin’s classic fourth album returned as their light show and singing pumpkins graced the planetarium again in *A Night of Horrors.* Dr. Kaler will give a talk entitled 1000 Years of Astronomy at the planetarium on 3 December. The local astronomical society presented a telescope buyer’s clinic on the evening of 14 October.

The Strickler Planetarium in Kankakee closed its doors for the summer months to do some major renovation. On their “to do” list was: installation of a restroom; renovation of hallway/entrance lighting; exhibit redesign; and an annual visit by John Hare of Ash Enterprises for maintenance on the Spitz A4. *Amazing Stargazing* has been installed and warmly received by the public and school groups. The *Explorers* from the Bishop Planetarium, has been received and is in the process of being installed. The addition of special effect projectors for a light show continues.

The Lakeview Museum Planetarium presented this fall, among other shows, *The Astronomy of the Great Pyramid* through October, in conjunction with the exhibit *Wonderful Things from Tutankhamen’s Tomb.* The museum exhibit features 120 museum quality reproductions from the Pharaoh’s sacred and personal possessions. The planetarium show was acquired from the South African Museum Planetarium. The Fifth Annual Interplanetary Bicycle Ride attracted 150 riders through the Solar System. The number was down this year, probably due to the 112-degree heat index (44° C). If anyone ever thought that it was cold in space, they haven’t been to Peoria in July! Next year’s ride is scheduled for 12-13 August 2000.

The ISU Planetarium begun the school year with the program *Hercules and Other Superhero Stars!* This show features a variety of super-heroes from many cultures who come to the aid of Deanna, a young girl who really wants to learn about the stars. Work has continued on the Planetarium Gift Shop throughout the summer. The grand opening occurred 10 September. A graduate student business intern will be added to the staff to manage the Gift Shop.

The Waubonsie Valley High School Planetarium had its Minolta Star Projector renovated in June. Many parts on the projector were replaced and a new control console was installed. The planetarium also had a Focal Point Systems automation system installed in August. Also, many of the planetarium’s slide and effects projectors will be replaced through the coming year. Mary Schindewolf
was selected into the JPL Solar System Ambassador Program and will be participating in on-line training early this fall.

**Ohio**

The planetarians of CRAP gathered for their summer picnic at the home of Bob and Ingrid Sledz in Rocky River on 13 June. After a decade of hosting this annual event, Gene and Pam Zajac passed this year’s torch (or is it water-hose?) to the Sledzes. An afternoon of food, fun, and good conversation was enjoyed by all. Missing from the picnic (with good reason) was Jeanne Bishop. She was in Japan under the auspices of the Fulbright Memorial Fund Teacher Program. During three weeks in Japan, Jeanne visited 20 different schools, including one with a planetarium, to learn more about Japanese education. Congratulations to Jeanne for winning this award!

From David Hurd: I regret to inform you that Aaron Brace, my technician at the Edinboro University of Pennsylvania planetarium, was killed in a car accident. He will truly be missed here as his fingerprints are all over this facility. Last year he did over half of my programs and was loved by the teachers and students. It is not often that you run across a student with talent and enthusiasm like Aaron had. He was 20 years old and a psychology major. I was always trying (and growing close, I might add) to having him switch majors to earth-space science education. He was on a fast track to becoming one of the finest planetarians around.

**Italian Planetaria’s Friends Association**

The planetarium and astronomical observatory of Treviso (north-eastern Italy) is situated in a school and managed by the local association of amateur astronomers. It organizes several activities for schools, teachers, and the general public. Director is astronomer Giuliano Romano. The 1999-2000 calendar contains a conference program about the main moments of physics and cosmology of the 20th century, the Sunday Planetarium projections for the public, and the planetarium meetings for amateur astronomers.

The number of Italian Natural Parks from far north to far south that are involved in astronomy activities continues to increase. Last summer, planetaria have been used also during public initiatives for tourists. In the Natural Marine Reserve of Ustica, a small island near the west coast of Sicily, an inflatable planetarium operated for some days. In the Gran Paradiso National Park, situated in the north-west of the Alps, mythology Starlab cylinders have been used without a dome inside the Visitor Center, thanks to the Magic Walls initiative.

**Serafino Zani Astronomical Observatory**

and Planetarium collects drawings made by children that have visited the scientific sites of Lumezzane. The drawings have been collected also through school exhibitions. The most interesting works are used for exhibitions, post cards and published on the Internet. The exhibition is found at www.cityline.it/cult/ZANI/disegni.htm. Serafino Zani Observatory would like to get in contact with foreign colleagues who organize similar activities. The objective is to create an astronomical childrens drawings exhibit with contributions from different countries that could be open in occasion of the next Day of Planetaria 19 March 2000.

**Middle Atlantic Planetarium Society**

The MAPS Board recently met in Prince Frederick, Maryland to discuss Society business and the upcoming annual conference. Conference host Shawn Laatsch led a tour of the Arthur Storer Planetarium, which fortunately received only minor damage from Hurricane Floyd. Laatsch’s plans and tentative schedule for the conference were reviewed by the MAPS Board. This was followed by a tour of the Holiday Inn Select in nearby Solomons, Maryland. The hotel has excellent facilities and a wonderful view of the Chesapeake Bay and the Patuxent River.

The 35th annual MAPS Conference will be held 3-6 May 2000. Our focus will be Astronomy Education 2000 and Beyond. A day trip is planned to the Maryland Science Center, the Davis Planetarium, and National Visitors Center for the Hubble Space Telescope. The Conference will feature Mini Dome Lessons, which allow planetarians to share their ideas on education in this unique environment. Two special guest speakers are tentatively scheduled: Fred Espenak from NASA Goddard (Highlights of the 1999 Total Solar Eclipse) and Dr. Susan Sakimoto from NASA Goddard part of the Mars Global Surveyor team (Volcanism on Mars). For more information contact Shawn Laatsch, Arthur Storer Planetarium, 600 Dares Beach Road, Prince Frederick, Maryland 20678, USA, phone 1 410-535-7339, e-mail 102424.1032@compuserve.com, and home page http://www.calvertnet.k12.md.us/instruction/planetarium/mapsconf.html.

MAPS newsletter The Constellation has added two new regular features this year. Steve and Jan Russo created MAPS Bits, a column about going on in the MAPS region. John Meader volunteered last year to take over the Society’s archives and is now writing Old MAPS: Views from the MAPS Archives. This has featured interesting photos of people and places in the Society’s collection.

**Nordic Planetarium Association**

This year’s NPA Conference was hosted by Timo Rahunen and took place 4-5 September at Särkänniemi in Tampere, Finland. Several planetarians from non-Nordic countries, among them IPS President Dale Smith and planetarian Vadim Belov from Nizhny Novgorod Planetarium in Russia, participated in the event, which included a membership meeting, paper sessions, and a workshop about digital image processing, 3D-animations and digital video, as well as a Saturday evening smoke sauna in Hanganlaiti (which was absolutely fantastic!). The membership meeting re-elected the NPA officers for another two years. A kind invitation from Hans Lundstrom, Kosmorama Space Theater, to hold the next NPA Conference in Borlange, Sweden, was accepted with acclamation.

During the membership meeting it was furthermore decided that NPA, which of course is open to members of all nations, especially shall invite Baltic state planetarians as members. Thus the NPA region includes not only Denmark, Finland, Iceland, Norway, and Sweden, but also Estonia, Latvia and Lithuania. Since this is the first time Baltic reports are included in the International News column, the NPA report will this time concentrate on those given at the NPA Conference. First Giedrius Straivasys:

“Our planetarium is in Vilnius, Lithuania. We have a 1.25 m dome and a Zeiss RFP star projector. There are 144 concentric seats. Most of our visitors are school children groups, but we also have public shows. We have shows from September until June, while July-August is our technical maintenance period. We usually have about five lectures a day from Monday through Saturday.

“We have extra equipment such as six All-Sky projectors, four slide projectors, a good sound system, and special effects projectors, including supernova sequence, expanding universe, and eclipsing double star bought from Sky-Skan. We also have some self-made projectors such as moon with a satellite, etc. Our director is Algimantas Azsuenis and I work as engineer of electronics.”

Then Helle Jaaniste, Science Center AHHAA, and Jaak Jaaniste, Astronomy Club of the Tartu Old Observatory, Tartu, Estonia:

“In 1985 the Tallinn Palace of Young Pioneers obtained a Zeiss ZKP-2 planetarium. Since the Palace had no room big enough, it remained at stock until 1988 when it was sold to Tartu. In Tartu a group of young astronomers put it up in the main building of Tartu KKE, one of the biggest building companies in Tartu. The planetarium was opened in September 1988 and operated...
until June 1989, when the time of contract terminated. At present, the projector belongs to the Astronomical Club of the Tartu Old Observatory, a non-profit organization which rents rooms in the old observatory building and acts as coordinator of school astronomy and amateur activities.

"As the previous owners, the Club has no space for the planetarium. We have a plan to rebuild one detached small telescope dome into a planetarium; the idea has been approved by the University government and reconciled with the Tartu Town Committee of Heritage. As always the main problem is money, but we hope it will find its solution during the next year.

"At the beginning of 1998 when the newly formed AHHA Center organized its first great exhibition, Mrs. Tiitu Sild (the project leader of the Center) had an idea to use the planetarium as a self-standing part of the exhibition. A plastic dome was mounted on a two-meter-high wooden base covered by textile and the dome was painted twice outside by opaque aluminum paint. So we got a pavilion with 80 seats, and with the operator's table put inside near the projector. The presentations were based on free improvisation, and the operator drove the projector manually showing the possibilities of a planetarium. For school groups, an educational part containing the diurnal motion of celestial bodies and the change of seasons was included.

"The exhibition opened at 26 May 1998 by Lennart Meri, the President of Estonia, and became extremely popular. During 36 days we had 22,000 visitors; most of them saw the planetarium performance. The planetarium took no extra entrance fee, but the total entrance fee of EEK 25 (approx. $2.00) was considered quite expensive for Estonians. The questionnaires filled in by visitors marked the planetarium as the most attractive part of the exhibition.

"During the winter, the planetarium was used by the Tallinn Science Center and set up in the building of the Tallinn power plant, today Museum of Energy. When Mrs. Sild planned her new exhibition in cooperation with the London Natural History Museum, the planetarium had been included despite of its obvious unfitness with giant robotic insects and other biological attractions. And again, our show became extremely popular, even if we lost our first place in the questionnaire to the British giant insects. About 35,000 tickets were sold, the total number of visitors exceeded 50,000, and most of them visited the planetarium. Daily we gave 6 - 10 performances, each one about 20 minutes long.

"The success of our planetarium led to the offer from the owner of the exhibition hall to keep the planetarium there without any charge up to the end of their next event, the yearly School Fair. We agreed with our lecturers that a small fee about EEK 5 ($0.30) would be established to cover their honorarium. To our great surprise we had only 20 - 30 visitors per seance, carried twice a day. One of our lecturers, who had worked during the first season of our planetarium 10 years ago, remembered that they had the same problem with small numbers of visitors also at that time.

"Now we come to the main conclusion of our report: the sky is wonderful, but nobody wants to pay for it. In order to attract people to the planetarium we must make some knight move on our educational chessboard, like connecting the star show to some popular amusement. As we know, most of planetarians use cinema-like effects to organize events in the planetarium. We propose another possibility: to include the normal (astronomical) show into the program of some larger event without extra fee. Our experience shows that if the event is popular, the entrance fee may be quite high and the planetarium will rise the popularity of the main event at every case. So we can bind the commercial success to our great aim - to popularize astronomy and bring more people to science.

"Two remarks concerning to the organizations mentioned above:

"Tartu Old Observatory (Tähetorn, the "Star Tower", web site http://www.obs.ee) is built at the beginning of last century and equipped by the world-famous astronomer F. G. W. Struve, author of one of the first catalogues of double stars, who first measured the stellar parallax in 1838. The building has kept its original view and there is a rich collection of old instruments. At present, the Observatory belongs to the Tartu University and is planned to be the main building of the coming AHHA Center.

"The Science Center AHHA of the Tartu University (website http://www.ahhaa.ee) was founded in 1997 by the initiative of Lennart Meri, the President of Estonia. The founders of the Center are Tartu University and the City of Tartu; some financial support has also come from the Ministry of Education, the Open Estonian Foundation, and some other authorities. The Center is in the project stage, project leader is Mrs. Tiitu Sild, and Chairman of Scientific Council is Prof. Jaak Kikas."

Pacific Planetarium Association

The Fleischmann Planetarium received a grant to help upgrade their observatory from a 12-inch Newtonian to a 14-inch Celestron telescope (30 to 36 cm). Keith Johnson wrote/produced their current show The Millennium Museum, which takes place in (yes, in) the moon in the year 2999.

The Holt Planetarium at Lawrence Hall of Science is near completion of its publication of the new PASS Volume: Northern Lights (on aurora). Planetarium folks interested in field testing this show before late spring, 2000, should contact Alan Gould.

O. Boyd Mathias has recently retired from teaching at the San Joaquin Planetarium.

The Minolta Planetarium at DeAnza College is upgrading its automation system (dating back to the 1960s) to the East Coast Control System. Also, their exterior dome was mysteriously painted red over the summer.

Russian Planetarium Association

A yearly tradition has been established in Nizhny Novgorod planetarium, namely to arrange the Astronomy Teachers Conferences in the spring and in the autumn near the holidays of equinoxes.

During the autumn conference this year, results from observations of the solar eclipse of 11 August were the center of attention. A group of Nizhny Novgorod schoolboys, schoolgirls, students, and teachers had observed the eclipse in France, some 70 km from Paris. They showed bright photos and a video-film that they had made.

On 5 November, Moscow planetarium will celebrate its 70-year jubilee. It will be the saddest jubilee in his history, because at the same time there is one more jubilee: 5th year since it was closed.

Volgograd planetarium celebrated its 45-year jubilee on 19 September. On 5-6 November, the Conference of RPA will take place in St. Petersburg.

Southeastern Planetarium Association

As I write this yet another hurricane is making its way up Florida's east coast, impacting our region. These powerful tropical storms occasionally threaten the Gulf coast or Atlantic coast of the U.S. For planetariums in the southeast, this year's crop of storms has caused suspension of operation, evacuation, and water damage, let alone the economic impact. The current storm is the third this year to wreak its havoc on the region and has yet to write its final chapter.

Again, as I write this, SEPA President George Fleenor is on his way to Tucson to record astronomer David Levy's narration of the light pollution mini-show that is being produced by SEPA. Meade Instruments and Magnaray International are providing major funding support for the project. Jon Serrie has been contracted to provide an original
music score. The show will be made available to SEPA members as well as IPS members and is scheduled for release in early 2000. Distribution arrangements will be announced soon.

Southwestern Planetarium Association

Over twenty-five SWAP’ers attended Desert Skies in Phoenix last October, offering an opportunity to finalize the year-long plans on Texas 2000. SWAP and other IPS affiliates are looking forward to extending that great Texas hospitality 4-8 October in the new millennium! Wilgus Burton, Garland I. S. D. Planetarium, sent the following information to SWAP’ers that we would like to share with yawall (Texan for you all; editor’s guess): Bob Wollman, Richard King Planetarium, certainly enjoyed being a consultant and guide to Star Parties, Inc. last summer. He participated in the trip to the extinct volcano Haleakata for observing and also visited the not-known-to-the-public U.S. Air Force operated observatory on the volcano.

From University of Texas, Mary Kay Hemmenway reported on the EXES (Echelon Cross Echelle Spectrograph) team at the UT Astronomy Department. This project to build a spectrograph for SOFIA, the Stratospheric Observatory for Infrared Astronomy, includes six meetings a year, field trip to Waco where a Boeing 747 is being modified to hold the telescope, and numerous other events. Find out more at marykay@astro.as.utexas.edu.

Congratulations to Charles Hemann, formerly at the University of Arkansas at Little Rock Planetarium, as the new Director of the Andrews I.S.D. Planetarium! Hemann and his family moved to West Texas last fall where Jan and Mark Wallace gave him that Texas hospitality. SWAP President Barbara Baber reported that the Morgan Jones Planetarium and West Texas Utilities has installed 16 solar panels outside the building. Here students can study the temperature, wind speed, graph and chart temperatures for a week to a month. These solar panels convert enough solar radiation into electricity to light several classrooms for eight hours per day in the school district. Another project in Abilene is Space 2000 during which every school in Abilene devoted a week to space and visited the planetarium. Maybe Baber should be connected to one of those solar panels!

Kudos to Jim Rusk, Russell Planetarium, as being picked by the StudyWeb as having one of the best educational web sites! StudyWeb is one of the Internet’s premier sites for educational resources for teachers and students. Check out Jim’s site at http://www.mesquiteisd.org/planet/index.html. If you are unfamiliar with StudyWeb check them out at http://www.studyweb.com. Has LodeStar, The Astronomy Education and Research Project of New Mexico, found that exceptionally talented, productive, energetic and organized person needed to direct and manage its planetaria/theaters? Sounds as if any of us could go for that one!

This SWAP report ends with inviting yawall to Texas (Dallas and metropolex) in October 2000!

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Zoom Tune-up

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Zoom projectors are great! Despite the recent introduction of video and digital graphics, I think the ubiquitous “zoom” is still one of the most useful and flexible tools in a planetarium. Particularly when coupled to a slew-mirror assembly, a zoom projector provides one of the best ways to portray the dynamic, three-dimensional character of space by depicting moving spacecraft and planets. However, along with its ability to animate a static image, the zoom projector presents a number of technical challenges to the planetarian. Let’s explore some tune-up techniques which will enhance the zoom in your facility.

Let’s explore some tune-up techniques which will enhance the zoom in your facility.

But first, a little background. The typical zoom unit, uses a standard Carousel-style projector together with a lens designed for a video or 16mm film camera. A bi-directional motor coupled to the lens provides manual or automated image zooming capability. But there’s a problem in mating the zoom lens directly to a Carousel-style projector. The physical size of the zoom — compared to the projector’s lens opening — prevents it from being mounted close enough to the slide to achieve a focused image.

To get around this problem, a “transfer optic” is introduced between the projector and the zoom lens. The extra lens(es) transfer a small, focused image of the slide forward into the rear of the zoom lens, which, in turn, projects a larger, focused version onto the dome. These intermediary optics have a short focal length, and come in the form of either one short focal-length projector or camera lens, or two lenses stacked one in front of the other. (In the case of two lenses, the first is typically a standard 100mm Carousel projector lens — installed in the pro-
jector - with the second lens about half the focal-length of the first). In both the one- or two-lens transfer systems, the combined focal length is about 25 to 30mm.

Depending upon the source and original design, the optics of your zoom projector will be in one of three configurations:

1) a standard projection lens mounted in the projector, and the zoom assembly with a small transfer optic mounted at its rear-end (Figure 1),

2) a similar arrangement to #1, but with small transfer optic mounted instead on the front of the projection lens (Figure 2), or

3) no separate projection lens, and a single, short-focal-length lens mated to the rear of the zoom (Figure 3).

The attachment scheme isn’t all that important, as long as the relative placement of the various components is correct.

Because of the additional lenses, the focus and optical alignment of a zoom projector can become a difficult - even baffling - process for many. However, if a few simple procedures are followed, even the novice planetarian should be able to optimize his or her zoom.

There are three main criteria to consider in order to maximize a zoom projector’s performance. They are aim, collimation (optical alignment), and focus. To the greatest degree possible, these criteria should be treated independently of other another.

Before starting any alignment adjustments, make sure that the entire zoom - including projector, transfer optics, and zoom lens - are firmly mounted on a single platform. If they aren’t, it will be impossible to establish and maintain an adequate optical collimation reference for the various components. (Many people make the mistake of independently repositioning the projector or zoom lens to change the aim of the image. This practice will invariably contribute to poor optical alignment, and should be avoided.) The best platform is a sheet of aluminum at least 6mm (0.25”) thick, and large enough to span a horizontal footprint created by all components. If aluminum is hard to obtain, you can use two thicknesses of plywood about 19mm (3/4”) thick, glued together to form a rigid platform that won’t bend or sag over time. Regardless of the material, make sure that the topside of the platform is painted or anodized black to minimize stray light bounce.

Also, make sure that the zoom platform or slew mirror - if you’re shooting the projector into one - has a way to be aimed independently of any optical collimation adjustments you’ll be performing. You can often add a convenient aiming capability to the projector platform by adding three machine-screw-style height adjustment feet (available at most hardware stores) - two feet at the rear, and one at the front of the platform (Figure 4). If you have an aluminum platform, simply drill and thread-tap three holes, and screw in the feet. In the case of plywood, just drill and mount thread inserts designed for attaching machine screws to wood (a T-nut works well here), and screw in the feet (Figure 5). Make sure to position the feet so that they won’t interfere with the placement of the projector or zoom lens. The three feet will provide you with the needed adjustment to the entire projector platform in both altitude and side-to-side tilt. Azimuth position is simply a matter of rotating the entire platform left-to-right in the cove.

**Optical Collimation**

In addition to minimizing optical aberrations, collimating the system will make your images zoom concentrically (the image will have minimal side-to-side or up-and-down drift, or skewing, as it zooms large or small). Start your optical collimation by visually lining up the barrels of the zoom lens, transfer lens, projector lens (if your system uses a separate projector lens), and the projector. This may require placing shims under the zoom lens’ support plate or the projector, if one optical centerline appears to be above or below the other. Of course, you can always raise and lower the front foot on the projector, but be careful that this doesn’t create an angular misalignment. Good vertical alignment is achieved only when all optical-component axes are parallel and at the same height above the platform.

Horizontal alignment is more straightforward, of course, as the front- or rear-end (or both) of each component can simply be slid left or right.

Fine optical alignment is achieved by turning on the projector lamp with a full-frame (full, unmasked, rectangular-format) slide in the gate. (A registration grid slide, or in the absence of that, a glass mounted slide with a paint or ink dot in the center is a big help here - we’ll find out why later.) You will likely need to do some trial-and-error repositioning of the zoom lens forward and backward along the optical axis to optimize light-cone transmission into either it, or the transfer lens (if the transfer lens is mounted on the zoom lens). In other words, the light exiting one lens should ideally fill, but not spill outside the rear lens element of the component directly in front of it. (If the light transmission is improper, you’ll end up with major vignetting, or uneven illumination of the projected image.) You may not be able to achieve perfection here, just optimize it as best you can.

Now, rough-in the focus by tweaking the projector lens and zoom lens. Note that the projector lens focus may adversely affect the previous adjustment, so readjust the zoom lens position, if need be, to compensate. Once you’ve achieved a rough focus, try zooming the lens in and out. A well-aligned zoom system will cause the projected slide to get large or small without drifting side-to-side or up-and-down. A slide with a center mark will serve as an accurate gauge of drift and misalignment during test zooming, particularly if it is projected over a fixed reference-point on the dome. Between zoom motions, make slight adjustments in the zoom-lens position relative to the projector. This will take some trial-and-error work, but eventually you should be able to eliminate most of the drift.
Focus Procedure

Now that the zoom system is aligned, it's finally time to adjust the focus. This is a major stumbling block for many planetarians because focusing a Carousel-mounted zoom requires two separate adjustments, and each must be made with the system in an opposite zoom state from the other. Because of a lack of understanding of this concept, many planetarians find that their zoom slides are focused when zoomed either larger or smaller, but not both.

Start the focusing procedure by running the zoom lens to the fully-large position. Then adjust either the projector lens, or the position of the zoom (relative to the projector) forward/backward until the projected image is sharpest (making sure not to misalign the optical system in the process). Now, zoom the image fully small, and then adjust the focus ring on the zoom lens itself until the small image is at its sharpest. It may take a couple of sets of these adjustments to get things "in the ballpark", so repeat this procedure until both "ends" of the zoom range show the sharpest image possible, and the alignment is still correct. You will probably find that there is some uneveness of focus in the image — particularly when it's zoomed large. This is to be expected. Simply try to get the best focus across the field of the slide, but if the center-to-edge focus difference appears excessive, opt for focusing on the central regions of the slide, since that's where the bulk of your visual content will likely reside, anyway.

Mounting Components

Once you've finished adjusting, and you're confident that collimation, light transfer, and focus are optimized, you can mark and fix the components' positions on the platform. Often the zoom lens assembly can be simply fastened to the platform with screws. To permanently position the projector - but also make it easily exchangeable with another unit - you can mount positioning blocks onto the platform at six to eight positions around the projector case (Figure 6). Readily-adjustable positioning blocks can be fashioned by cross-cutting sections of hardwood dowel and drilling off-center screw-holes in them. This method creates an eccentric "cam" which is easily adjusted by loosening the screw, rotating the dowel section, and retightening the screw again (Figure 7). Once these are mounted and the optimum projector position is established, set the dowel adjustments by rotating each block until its rounded edge contacts the projector case, then tighten the screw until the dowel is anchored firmly against the platform. Just make sure that the positioning cams are tall enough to hold the projector's position regardless of any small projector-height adjustments you might make. If you ever need to changeout a malfunctioning projector with another unit, simply dropping the new unit into the space between the positioning blocks, tweaking the projector's height adjustment feet, and quickly readjusting focus will get you up and running again, without major, time-consuming realignments. To save even more time in projector changeout, you can precisely measure the space between the underside of the projector and the platform, and cut several more blocks to that size. These blocks can be mounted to the platform using glue or countersunk screws under the projector case. These additional "height blocks" will make height and tilt adjustments of a projector unnecessary at equipment changeout. In this case, just make sure that the adjustment feet on the projector are retracted fully.

Dealing With Image Problems

One of the more frequent complaints with zoom projectors relates to poor or inconsistent image focus - even after adjustments have been made. The first remedy for this is to use glass mounts. I've talked about this subject several times before — so I won't spend too much additional energy here — but glass mounts are the only surefire way to ensure sharp focus with a slide projector. Holding the film rigidly in position is even more critical in a zoom projector, because slight slight variances from the focal plane show up more readily than in most conventionally-lensed projectors.

Other non-adjustment-related focus problems concern the quality and interactions of the optical components themselves. First, it's important to bear in mind that any system with multiple standalone optical units will tend to degrade image quality to some extent, especially if the individual units weren't precision-matched to each other by an optical engineer. In the world of planetarium folks, the process of mating components together to create a zoom projector is often a hit-and-miss proposition, at best.

If your images still look unusually "soft" even after switching to glass mounts and making careful adjustments, it could be that a swapout of a projection or transfer lens might do the trick, though this is a trial-and-error process. The easiest change is to try a different projection lens. If you can find a similar focal-length projection lens of a slightly different optical design or from a different manufacturer, it might be worth trying a substitution, particularly if you can borrow the lens for the test. Interestingly enough, we've found that in some cases, changing from a higher-quality after-market projection lens, to a slightly lower quality, original-equipment Kodak lens will sometimes actually provide a perceived quality increase, particularly in edge sharpness. This fact probably has more to do with the overall field curvature of each lens in the system and how they all combine to produce the final zoom image, rather than in each components' individual optical quality taken alone.

Figure 6

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Likewise, the original transfer-lens choice may be marginal. For systems with separate projection, transfer, and zoom lenses, the transfer lens is usually around 50mm in focal length. Lots of alternate lenses fall in this range, including surplus lenses originally made to project 16mm films, and lenses for 35mm SLR cameras. Camera stores that deal in used equipment sometimes have “junk bins” of old SLR lenses that are in good shape, optically, but have some other problem (they might have been made for old, obsolete cameras, or the iris mechanism is might be broken). You might try a test swapout of the transfer lens to improve the image, though it might prove a bit challenging to find suitable attachment mounts. You might try fashioning a crude coupling using plastic plumbing fittings and masking tape to temporarily mate two lenses together for testing purposes. (Just make sure that the makeshift tube is blackened on the inside to minimize light reflections.) If you do find a better lens selection, you can then get a machinist to make a permanent coupling for you.

Sometimes, two-lens-component zoom systems (those with just a zoom and a single-unit transfer lens) have a sharpness disadvantage – particularly when zoomed large – over their three-component counterparts. In part, this can be due to the fact that the total combined optical system is “faster” (passes more light) than a three-component system, but reveals any uneven optical matches between the components more readily. The three-component systems can be somewhat resistant to this effect, simply because the extra lens tends to effectively “stop-down” the zoom system. To remedy the softness in two-component systems, it may be worth stopping-down the zoom or the transfer lens by one or two stops. You will lose some of the brightness-gain you would otherwise achieve with a two-lens setup, but the resulting increase in sharpness may make the tradeoff acceptable.

Mechanical Fixes

The zoom can encounter mechanical problems, too. A motor failure will be pretty obvious, but what happens if the motor turns and the zoom ring doesn’t?

In such a situation, it’s time to check for slippage in the mechanism. Lower-end zooms are often driven by a simple rubber belt or O-ring. Over time, the belt may stretch and become loose, or lose its resiliency and grip on the pulleys. Sometimes, replacing the belt is the only solution. However, if the belt isn’t over-stretched you may be able to improve the belt’s pulley-grip with a chemical rubber rejuvenator. You can get a bottle – intended for tape machine belts and rollers – at an electronics shop.

Some zooms are driven via gears or cable-chains through a special motor-shaft-mounted slip-clutch designed to prevent mechanical damage when the lens reaches one or another of its end-stops. It’s important, by the way, to make sure that you minimize running the stopped zoom mechanism for long periods as this will wear out the clutch. If your slip-clutch is the type with two large machine nuts, a coil spring, and a washer on its shaft, it should be an adjustable type. In this case, you may be able to stop the slippage by loosening the two nuts against one another, turning the inner nut in to compress the spring, and the tighten the nuts together again. Just make sure that you don’t increase the spring tension so much that the clutch fails to slip before straining the motor or mechanism.

In addition, some of these adjustable clutches’ friction pads will periodically wear down. These pads are tiny cork disks glued into recesses in the circular clutch plate. You can access these by removing both nuts, the coil spring, and the thrust washer, and lifting away the gear or sprocket from the shaft. If the cork disks are worn down to the level of the surrounding metal disk, you’ll need some new ones. Simply get some thin sheet cork material and carefully cut out some new disks with an X-acto knife. Scape away the remnants of the old cork and glue the new disks in using a suitable adhesive. Finally, reassemble and adjust the clutch, and you’re back up and running.

With a little ingenuity and patience, you can tune up that zoom projector and more effectively display moving planet and spacecraft images in your theater.

The 112th Annual Meeting of the Astronomical Society of the Pacific

Public Symposium: Universe 2000
(Saturday 7/15 - Sunday 7/16)

Higher Education Symposium
(Monday 7/17 - Tuesday 7/18)

The program is intended to provide a meaningful and engaging experience for all ASP members. Everyone is encouraged to attend the public symposium, which complements the other symposia. Four interdisciplinary panels exploring the relationship between astronomy, the arts, and other areas of human endeavor should be of particular interest to members' families and guests. Field trips to the Jet Propulsion Laboratory, Mount Wilson Observatory, Griffith Park Observatory, and other engaging destinations are also being planned. And of course, all of our members are encouraged to attend the gala evening party on Saturday, July 15!

The ASP 2000 meeting is scheduled to conclude as ASTROCON 2000, a major amateur astronomy meeting, begins. Convened by the Astronomical League, ASTROCON 2000 will be hosted by the Ventura County Astronomical Society in Ventura, California.

Join us at ASP 2000 as we kick off the next millennium of astronomy and space.
The Earth Sciences Initiative

Last July, my museum was one of a dozen U.S. museums that met at the Denver Museum of Natural History with representatives of NASA’s Earth Science Enterprise (ESE) and the Jet Propulsion Laboratory (JPL) to brainstorm about how NASA could better reach the universe of informal education institutions (science museums, planetariums, zoos, aquariums, etc.) and engage in mutually beneficial collaborative projects. Our community was well-represented there, with Doug Baldwin of the Kelly Planetarium at Discovery Place in Charlotte, North Carolina, Ken Miller of the Center for Space Education at Bishop Museum in Honolulu, Hawaii, Jim O’Leary of the Maryland Science Center in Baltimore, Maryland, Dennis Schatz of the Pacific Science Center in Seattle, Washington, and me among those in attendance. The NASA folks were especially interested in discussing how they might reach those facilities that they weren’t reaching at present.

The result of two days of directed brainstorming was a list of possible collaborative projects which could be used to integrate NASA Earth Sciences resources into informal institutions around the U.S. (with additional implications abroad, perhaps — this is my personal feeling). The Denver hosts and ESE people have subsequently refined the list to about a dozen such project models or concepts briefly stated, and have been surveying museums at the October Association of Science and Technology Centers (ASTC) meeting in Florida as well as through exhortations to fill out the survey at web site talktojpl.nasa.gov to find out which of these ideas are the ones that most interest informal educators as possible projects for developing collaborations and partnerships with NASA.

NASA wanted museums to fill out the survey between October 15 and November 15, and that time is now past as you read. But if you haven’t, let me encourage you to check out the web site anyway. If the survey is still active, fill it out; I’m sure NASA would find your input useful even a few weeks after the deadline. And if the survey isn’t active, then contact either Marguerite Syvertson at NASA/JPL, telephone +1 818-354-6492, or Shannon Voirol at the Denver Museum of Natural History, telephone +1 303-370-6495 to express your interest in this initiative and to find out how you can offer input.

This is important. Thanks to the Earth Sciences Enterprise which sparked this effort, NASA is sincerely interested in connecting with facilities like ours and listening to how they might most effectively help us in our efforts to enlighten people about Planet Earth. And there were strong intimations at the Denver meeting that successful efforts might serve as models for other areas of NASA. So please participate. It’s not often we have so direct an ear to NASA; let’s take advantage of it!

The NEW Program

This past summer, I participated in yet another effort which suggests that NASA is seriously interested in us, as one of a group of 25 informal educators from nine U.S. states who gathered at Johnson Space Center (JSC) in Houston, Texas for a one-week workshop modeled after NASA’s NEWEST (NASA Education Workshop for Elementary School Teachers) and NEWMAST (NASA Education Workshop for Mathematics, Science, and Technology teacher) programs.

This workshop, however, was designed for the informal education community, with the International Space Station (one of JSC’s primary efforts) as the focus. For a week, we toured JSC’s extensive facilities from Mission Control to the Neutral Buoyancy Lab to the ISS and TransHab mock-ups, played with simulators, chatted with astronauts and experts, engaged in hands-on activities from NASA’s voluminous resource offerings, were briefed on those resources, participated in a teleconference with astronaut Ellen Baker and two other sites, made new friends, and took home a ton of materials. Even the off-hours were filled with inspiring moments — from observing the fiery re-entry of STS-93 across the sunset sky of Houston, to rubbing elbows with astronaut Cady Coleman from that very mission at an astronaut waterhole just three days later where she was playing the flute in an ensemble for charity, to the thrill of an evening screening of the movie Apollo 13 in the very control room where the drama unfolded nearly 30 years ago. It was all simply wonderful.

It’s very encouraging to see that NASA realizes that informal educators are an important part of the educational mix, and are providing such opportunities for enrichment and growth. Such efforts will reap benefits for NASA, for us, and for the varied public we serve. There were intimations that more such informal educator workshops may be in the works at JSC and at other NASA centers around the U.S. Please let me encourage you to encourage NASA in these efforts and to inquire about specific upcoming opportunities for yourselves. Such responses may provide positive feedback to NASA to continue these efforts. Good people to contact about this (who are just plain good people) are Bob Fitzmaurice, NEW Program Manager, NASA Johnson Space Center, Mail Code AP2, Education and Community

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Planetarian
Lasershow Designer

The next-generation system for the new millennium

If your planetarium is interested in laser shows, then you probably know about our Lasershow Designer. It's the world's most popular software for professional-quality laser shows.

Now, we've made so many improvements that we're introducing Lasershow Designer 2000. It uses the all-new QM 2000 board, to give you ten times the processing power of our older LD system.

**Faster speeds for faster scanners**

LD 2000 is specially designed to get improved graphics from new, faster scanners. It can run at 120,000 pts/sec, which easily supports ILDA 60,000 pts/sec speeds -- twice as fast as the 1990's standard.

Twice-as-fast speeds mean twice as much detail in your graphics. It's like getting a second set of scanners for free!

**New effects for better images**

LD 2000 has new tools for artists. Lines can be feathered for soft endings. This is perfect for depicting comets and other wispy phenomena.

With more colors and faster speeds, you can now project long video sequences. The woman's picture above shows the amazingly improved photorealism you'll get using standard laser scanner projectors.

**Compatible with ILDA, Pangolin**

LD 2000 is compatible with ILDA connectors, DMX lighting, and Pangolin projectors. Any show created on the older LD for Windows system will run on LD 2000.

You can use any standard Windows 95/98 or NT/2000 computer. The new QM 2000 board fits right into modern half-size PCI slots -- you probably already have LD-compatible equipment in your facility.

LD 2000 retains the best features of the multi-award-winning LD system: over 25 free shows, thousands of clip-art frames, free lifetime updates, and free phone support. And you'll be completely satisfied, thanks to our unconditional 90-day money-back guarantee.

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For more information call us or visit Pangolin's extensive website. You'll find out why LD is the #1 choice of planetarians and other laser show professionals.

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The NASA Implementation Plan for Education

By the by, in both Denver and Houston, much was made of the “NASA Implementation Plan for Education 1999-2003”. This document outlines NASA's education strategy in the short term. If you want to know the context for NASA's educational initiatives, read this document; it will provide some very useful insights. To get a hard copy or to get more information, contact: NASA Headquarters, Education Division, 300 E Street SW, Washington, D.C., 20546 USA. Or to access the document via the Internet, go to the web site education.nasa.gov. The web site also has links to resources for informal educators among others. Check it out!

Out of Phoenix

Recently concluded as I write is the “Desert Skies” conference of the Rocky Mountain, Pacific, Southwest, and Great Plains U.S. planetarium affiliates held in Phoenix, Arizona in mid-October, hosted by Ryan Wyatt, Christine Shupla, Mike George and the rest of the Dorrance Planetarium gang at the Arizona Science Center. With some 160 in attendance including many from beyond the western U.S., and with a multitude of technologies and products on display, it felt almost like a mini-IPS conference. There was a great deal to see and do and learn about. Following is but a brief sampler, for follow-up on your part as your interests may lead you. Enjoy.

From Spitz came one of the funkiest openings to a paper presentation I've seen in some time, performed by none other than George Reed — a man of many talents, but choreography, too? He continues to amaze. Nearly as memorable was his and Joyce Towne's demonstration of the new Spitz ATM-4 automation system, about as user-friendly a setup as I've seen. The clever cue-based system is designed so that every device in your theater (including star projectors, video and multi-axis thingies) is assigned to a show time track displayed on a computer screen; mouse action allows you to set the device to do something at any point in the time track of your show. A series of menu choices and simple type-ins allows you to program the device for fade, brightness and motion rates, for example, and the setup is as easy to change as it is to grab hold of something with your mouse and click. The system runs on a PC, is capable of virtually unlimited numbers of tracks (i.e., controlled devices), can control virtually anything with a serial plug, and is a ready match for the Spitz 1024 and 512 systems. As one who has had programming experience on several automation control systems, I was very impressed.

For more information and prices on this and other Spitz products (which include the systems S12 and fully-automated 1024, the beefier Space Voyager for large theaters, domes, and Electric Sky — the “surround video” system with digitally-based "ImmersVision" format capable of immersive experiences and interactivity), contact George or Joyce Towne at Spitz, Inc., P.O. Box 198, Route 1, Chadds Ford, Pennsylvania 19317 USA. telephone +1 610-459-5200, fax +1 610-459-3830, e-mail jtowne@spitzinc.com, web site www.spitzinc.com.

From Zeiss came news from Pearl Reilly of the 75th anniversary symposium held in Germany honoring Walther Bauersfeld's projection planetarium, and of the laser image projector sneak-preview there. (Look for a full-blown demonstration at the upcoming IPS meeting in Montreal next year; it should be well worth seeing! She also reported on the Universarium M-VIII to be installed at Chabot Observatory in California and the M-IX going to the Hayden Planetarium in New York City. For information on these and the Zeiss product line which includes the Starmaster ZMP for medium to larger domes (and fitted with Zeiss' fiber optics technology as well) and the Skymaster ZKP3 for smaller domes, contact Pearl at Seller Instrument, 170 E. Kirkham Ave., St. Louis, Missouri or at her office in New Orleans. Her telephone number is +1 800-726-8805, her fax is +1 504-764-7665, and her e-mail address is preilly@aol.com. Those outside the U.S. may wish to contact the Zeiss company directly. The IPS Resource Directory gives contact information as Carl Zeiss Jena GmbH, Planetarium Division, Tatzendpromenade la, D-07745 Jena, Germany, telephone +49 3641 642406, fax +49 3641 643023, e-mail planetarium@zeiss.de, web site www.zeiss.de.

From Minolta came word of star plate technology that laser-cuts star plates with star dots down to “less than half the size of a human blood cell,” with up to 26,000 stars achievable for larger domes down to magnitude 7.5. For more information on this technology, or its Infinium series, MS series, and Cosmoleap projectors for planetariums of assorted sizes, contact (in North America) MEGAsystems, Inc., 435 Devon Park Drive, The 500 Building, Wayne, Pennsylvania 19087 USA, telephone +1 610-225-7200, fax +1 610-225-7258, web site http://www.870.com, or the Minolta Planetarium U.S. Office. 101 Williams Drive, Ramsey, New Jersey 07446 USA, telephone +1 201-934-5347, fax +1 201-818-0498. For Southeast Asia, contact Minolta Malaysia Sdn. Bhd./Planetarium Division, No. 12, Jalan SS 8/2, Sungai Way, 47300, Petaling Jaya, Selangor, Malaysia, telephone +60 3 7761133 or 7756541, fax +60 3 7761767. Or contact Minolta Planetarium Co., Ltd., 2-30, Toyotsu-Chu, Suta, Osaka 564-0051, Japan, telephone +81 6 386 2050, fax +81 6 386 2027.

From Minolta/MEGAsystems, companies teamed in the U.S. to provide planetarium and film installations, came word of a new infrared remote control, termed as a “console in your hand” by Shigeki Ogawa and Phil Groce, and progress on the new facility in Baton Rouge, Louisiana, which will include a Minolta Infinium projector, AVI's Omnicorn full-dome laser projection system, Sky-Skan's SkyVision all-dome video system, MEGA-system's MegaSphere 8/70 film system, under an Astro-Tec dome. (Talk about loaded! For information on MEGAsystem's film systems, contact Phil, or Mark Adukiewicz, director of regional sales, at MEGAsystems, Inc., 110 Riberia St., P.O. Box 4186, St. Augustine, Florida 32085 USA, telephone +1 904-829-5702, fax +1 904-829-5707, e-mail MADUKIEWICZ@MEGASYSTEM.COM.

From Goto came lots of literature on its assorted products, including Virtuarium, its all-dome full-color projection system offering immersive environments and experiences in partial-dome or full-dome configurations, and planetarium projectors ranging from the Super-Helios sporting 38,000 stars down to magnitude 7.9, through its G-series for large to small domes, to its E-series for tiny domes. The company also offers the Astrovision 35/70 film system and telescopes. For more information, contact Goto Optical Manufacturing Company, 4-16, Yazaki-cho, Fuchu-shi, Tokyo 183 8530 Japan, telephone +81 42 362 5312, fax +81 42 361 9571, e-mail info2@goto.co.jp, web site www.goto.co.jp.
From Evans & Sutherland came news that its StarRider full-color all-dome real-time computer-generated video projection system has sprouted multiple personalities and now comes in a number of flavors to meet different needs and budgets. You can get StarRider LP (offering one to six channels of high-resolution digital video in linear playback mode), StarRider SV (PC-based and offering rendering capability), StarRider PC (fully interactive, PC-based, single-channel configuration), or StarRider IG (the original version, using an E&S image generator with one-to-six channel capability, fully interactive). Full- or partial-dome configurations are available, depending on which system you get.

In Phoenix, E&S demonstrated two other StarRider manifestations designed to be low-cost entries into the game which can ultimately be upgraded to a full StarRider system. The first is StarRider DXF, a PC-based single-channel system which can project standard video imagery or 2D and 3D computer graphics and animation through a video projector. Graphics and animations can be controlled in real time or programmed to play as part of a show, and can cover as much of a dome as a standard video projector is capable of doing. The cost is about $19,000 US.

The second manifestation is called StarRider DXFi, and adds interactive digital effects capability to the DXF system. Both versions were run through their paces, showing some nice stills, video and animation sequences. In the case of DXFi, four people were called upon to manipulate controls to try to get a Mars lander down safely on the Martian surface. I found it all quite impressive, and a relatively low-cost way indeed to get an entry-level system that can enhance a planetarium's visual capabilities.

Also demonstrated in Phoenix were the E&S sun and moon projectors, first demonstrated last year at the IPS conference in London. The little machines are to interface with the II system to provide realistic sun and moon images that act in concert with the Digistar II system to provide realistic sun and moon imagery that act in concert with the Digistar with proper positioning and, in the case of the moon, phasing. But Sky-Skan, subcontracted to design them, made the little critters a lot more flexible than that: you can map most any surface onto the computer-generated globes projected by the devices to show most any planet and moon, and zoom up from dots to give small sun-and-moon-sized images. In Phoenix, the devices first masqueraded as Betelgeuse and Rigel with corresponding colors. Then one became an orangey Mars drifting through the starfield and zooming up to show telescopic details.

Then they became the Martian moons Phobos and Deimos scurrying across the Martian sky.

Of course, they also became the sun and moon, but I must admit that as such, they didn't look as good as they did in London — where they were positively breathtaking. In Phoenix, the sun seemed off-color, and it was difficult to make out the Man-in-the-Moon's face. I understand, however, that the equipment has changed somewhat from that demonstrated in London, and the temporary conference installation may also have been a factor. In any case, when they are tweaked to look as good as they did in London, they will indeed be sights to behold. The devices still cost about $60,000 to $65,000 apiece, as I recall.

Another piece of news announced by E&S in Phoenix was the appointment of Terence Murtagh (formerly director of the Armagh Planetarium, a past president of IPS, and a pioneer in the use of video and interactive systems in planetariums) as the general manager of its Digital Theater Division, which manages Digistar, StarRider, and other E&S products for education and entertainment. Terence will be taking time from his thriving Triton Productions operation in London, which produces planetarium and theater programming as well as programming for such entities as the Discovery Channel, to manage the division. Since Terence knows us and knows the field, it should make for some exciting times as E&S develops its product lines and its content libraries. Best wishes in the endeavor, Terence.

For more information on E&S products including StarRider and Digistar II, contact Jeri Panek at Evans & Sutherland, 600 Komas Drive, Salt Lake City, Utah 84108 USA, telephone +1 801-588-7500, fax +1 801-588-4520, e-mail panekJ@es.com, web site www.es.com.

From Sky-Skan came a new SkyVision demo in the Dorrance Planetarium which included some elements repeated from the 1998 London demonstration plus new imagery, projected through six new video projectors which seemed to make the resolution even better than in London, which was itself quite remarkable for all-dome video projection. We were whisked through assorted imagery ranging from ganglion-like structures to real videotaped landscapes, from assorted starscapes and celestial objects to an impressive collision between Earth and a Mars-sized object to create the moon, to a futuristic moon landing, to a stunning view of the International Space Station drifting overhead with the Earth beyond. All quite remarkable!

SkyVision — another of the full-color, all-dome, video projection systems — is available in three-projector panoramic format (covering about 220 degrees azimuth and 65 degrees altitude), in four-projector half-dome format, and the six-projector all-dome format we saw demonstrated in Phoenix. The system can play video, scanned motion picture footage, or 2D and 3D computer animations. A rendering station is available for in-house production, and a 30-minute "Volume One" library of high-resolution astronomical simulations comes with the system.

During the conference, Steve Savage also conducted a side-by-side comparison of video projection from laser disk, DVD, and hard disk sources for the assembled conferences. To my unpracticed eye, the three looked very comparable, with the DVD projection seeming to have a bit of an edge on sharpness in the simulated rings of Uranus, for example. Steve reported, by the way, that Pioneer is discontinuing the pressing of laser disks in the U.S. and will continue pressing only in Japan, which suggested to Steve that laser disk is on the way out as a video format in favor of DVD and perhaps other programmable formats. But he said his company would continue to support those who have purchased Sky-Skan effects laser disks.

Finally, the new SkyVision 1999-2000 full-color catalog was available in Phoenix. It tells all about SkyVision, theater design and portable dome services, SPICE automation, sound systems, DigiDome image processing, Sky-Skan's extensive library of video effects (encompassing 14 laser disks), optical special effects devices, zoom and slew equipment, shows and production services, slides, and deep space all-sky images adapted from the photographs of David Malin of the Anglo-Australian Observatory.

New to the catalog this year are an impressive set of all-skies photographed by Geoff Chester of the National Air & Space Museum, featuring a wide range of optical and radio observatories and selected landscapes. Also new are a series of artwork panoramas from the same source.

There's lots and lots of stuff here to help you do what you do; for more information and a price list, contact Paul Tetu, Sales and Systems Specialist, Sky-Skan, Inc., 51 Lake Street, Nashua, New Hampshire 03060 USA, telephone +1 603-380-8500 or +1 603-380-8500, fax +1 603-882-6522, e-mail tetu@skyskan.com, web site www.skyskan.com.

From Bowen Productions came a special workshop on the company's AstroFX technology, which uses a re-recordable hard disk media to program up to four and a half hours of video clips for instantaneous playback in your theater. Jeff Bowen also demonstrated the system in the Dorrance Planetarium, and the video imagery looked as if you were reading it naturally.
good to my unpracticed eye as any of the other video demos we saw during the conference.

AstroFX 1.1 is PC-based and offers DVD-quality video playback, according to the company’s information, and can interface with control systems from Joe Hopkins Engineering, East Coast Control Systems, Sky-Skan, and Spitz. More advanced versions are offered which provide additional capability and quality exceeding DVD according to Bowen Productions. The cost of the basic 1.1 system is listed at $2,995 U.S. Version 2.1 costs $4,995, and Version 3.1, $9,995.

Jeff Bowen also ran snippets of his company’s latest Astro Notes show, the 25-minute Mystery of the Missing Seasons. For more information, see the guest review that appears later in this column.

 Bowen Productions offers a wide variety of services including custom exhibit and show production, soundtrack production, facility and system design for multi-media theaters, and special effects video animation among them. To check out these services, and to learn more about AstroFX and Astro Notes shows, contact Jeff Bowen or Tom Hocking at Bowen Productions, 748 East Bates Street, Suite 300, Indianapolis, Indiana 46202, telephone +1 317-226-9650, fax +1 317-226-9651, e-mail bowenprod@aol.com, and/or check out the web site at www.bowenproductions.com/planetarium.

From JHE came Joe Hopkins and Troy McClellan with samples of slides from their available show productions including Bear Tales, Daughter of the Stars on Native American mythology, Welcome to the Universe, a short intro to any planetarium, and two of their newest, Stars to Starfish and Midnight’s Canvas. We also saw a number of their Joe Tucciarone-created all-skies including colorful artwork of nebulae and galaxies which looked very good on the Dorrance dome, and sell for $150 U.S. a set.

JHE also sells digital audio production software called “AudioStar” which provides for multi-track non-destructive editing, mixing, and manipulation of soundtracks. The basic version (selling for $3,995 U.S.) includes a 17-inch (43cm) monitor and a four-channel audio interface. The AudioStar Plus version substitutes an eight-channel audio interface and includes basic noise reduction software and CD-ROM backup; it sells for $4,995. The AudioStar Master system adds a CD audio mastering system for creating compact disk masters, and a comprehensive noise reduction and removal package; it sells for $5,995.

JHE is also working on a video production system called “VideoStar” which will allow the editing of video from most any source, stored on hard disk with playback capability, JHE is looking at going to DVD specifications for the system, and estimates a cost of less than $10,000 when it’s introduced.

JHE offers a variety of custom services and equipment in addition. For more information, contact Joe or Troy at JHE, 4301 32nd Street West, C-1, P.O. Box 14278, Bradenton, Florida 34280 USA, telephone +1 800 JHE 5960 or +1 941-794-3200, fax +1 941-753-1482.

From East Coast Control Systems came literature on its control devices named for constellations, unified under its Universal Theater Control System. East Coast offers a full range of modular automation devices, plus a cove lighting system, white light laser
projection systems (we witnessed a laser demonstration in the Arizona Science Center's large-format film theater and I was mightily impressed with the brightness and vibrant colors of ECCS's system), and a package for converting the front end of the R.A. Gray MC-10 automation system into something newer and more user-friendly (I dunno; are we MC-10 facilities ready to give up those eight-inch floppy disks?).

The price list shows devices ranging from a few hundred dollars U.S. to about $1,000 for the video controller; call John Frantz for price quotations on the laser and lighting systems and the bigger and more complex items. John can be reached at East Coast Control Systems, P.O. Box 486, Bigler, Pennsylvania 16825 USA, telephone +1 814-857-5420, e-mail jfeccs@aol.com.

From Ash Enterprises came word that the company "is now in a position to meet your planetarium needs on a full time basis." The company offers a variety of services including technical design and consulting for planetariums to put together complete system packages working in concert with vendors and manufacturers. Ash provides planetarium maintenance and refurbishment services for a number of Spitz and Goto projector models (and is a factory authorized US. Goto service representative). It also creates special effects—notably, its warp drive special effect which uses an overhead projector (sells for $795 plus shipping—$100 less if you provide the overhead projector).

For information on services and products, contact John Hare at 3602 23rd Avenue West, Bradenton, Florida 34205 USA, telephone +1 941-746-3522, fax +1 941-750-9497, e-mail jh hare@aol.com, or Eric Melenbrink at 1221 Stanhope Avenue, Richmond, Virginia 23227 USA, telephone +1 804-266-7966, e-mail e.melenbrink@ att.net.

From Astro-Tec came word that all of their dome-building staff are as busy as can be, constructing domes for planetariums, flight simulators, and specialized projection needs. The company builds all sizes, and re-paints domes that grow dingy with the years (and with the ubiquitous spitballs and dripping sprinkler systems). For the latest information on what it takes, contact Astro-Tec Manufacturing, 550 Elm Ridge Avenue, Canal Fulton, Ohio 44614 USA, telephone +1 216-854-2209, fax +1 216-854-5376.

From Audio-Visual Imagineering came another demonstration of its innovative OmniScan full-dome laser projection system, which can do laser shows with abstract forms and animations or can support astronomy shows with a variety of hard- and soft-focus astronomical effects. All of these capabilities were illustrated in a series of short programs including their demo Paradigm Shift and a bit of a rock-'n roll laser show, with imagery ranging from a galloping Pegasus and swirling quasar jets to clever abstracts. Great effects. Great colors. Compact system. What will lasers do next?

For pricing and information, contact Joann Young at Audio Visual Imagineering, Inc., 10801 Cosmonaut Blvd., Orlando, Florida 32824 USA, telephone +1 407-859-8166 or +1 800-952-7374, fax +1 407-859-8254, e-mail joanne@av-imagineering.com, web site www.av-imagineering.com.

From Laser Fantasy International came a
second demonstration of an all-dome laser projection system, this one called Luminosphere. The demonstration was an excerpt from LFI’s Mission Impossible show, as I understand, with assorted laser abstracts and animations, and a cute LFI logo sequence at the end. Scott Huggins indicated that the system sold for $145,000 U.S. and could be modularly added to existing LFI systems.

For more information, contact Scott at Laser Fantasy International, 8411 154th Ave. NE, Redmond, WA 98052 USA, telephone +1 425-885-7161 or +1 800-347-7525, fax +1 425-883-7169, e-mail scott@laserfantasy.com, web site www.laserfantasy.com.

From Loch Ness Productions came not one but two shows presented in the Done- rance theater. The first was Light Years from Andromeda in its 1997 edition, featuring a spruced-up script from Carolyn Collins Petersen, the narration of Star Trek’s Michael Dorn (“Worf”), new artwork from Tim Kuzniar and Michael Carroll, and a new soundtrack from Mark Petersen. The show opens with a brief history of human evolution and beliefs regarding the sky as a beam of starlight from the Andromeda Galaxy heads Earthward, then continues with a wider discussion of speeds and distances in the universe. The Nessies managed to sidestep pretty well that pesky recent Hipparchos data by giving distances to Andromeda of “over” two million light years (smart move!), and my only quibble with the show is that Michael Dorn—who has a wonderful deep voice for narrating—is just a bit too Worf-like (that is, halting) in his narration. But I like the show’s concept and the good, solid astronomy it portrays, and the visualization and sound are up to Nessie standards. The show runs 30 minutes, you get 150 slides, and you can ask for the show tape in a variety of audio formats including DAT, ADAT, DA-88, cassette, 7.5 ips half-track, or 7.5 ips quarter track. Check it out if you haven’t already.

The second show presented was Sky Quest, originally commissioned for the Einstein Planetarium at the National Air & Space Museum in Washington, D.C., and which is one of their most requested shows. This show is a winner in every way, as a young woman recounts her personal quest to know and understand the night sky from her early constellation-finding camping experiences and “visits” to Mars in a cardboard rocket, to her role as an adult astronomer sharing telescopic views the moon and planets. The show has a fine script, and is narrated engagingly and expressively by Roxann Dawson, who plays the chief engineer on Star Trek: Voyager. There is some nice video footage especially at the beginning to introduce the female character, there is good Tim Kuzniar artwork throughout, and the Nessies have produced a lovely, ruffly score to go behind. I really like this show.

Sky Quest is, by agreement with Einstein Planetarium, distributed by Sky-Skan, Inc., but you can check out the Nessie web site at www.lochness.com to get complete details on ordering. The show includes performance license, script, 90 slides including two all-skies and several pans, and a video in either DVD or CAV videodisk format — plus SPICE system cues and production notes and reference video. The show’s base price is listed at $2,495 U.S. Contact either Sky-Skan or Loch Ness Productions for more details.

Loch Ness also distributed its 1999 fall catalog which includes an expanding library of shows, music “back packs” for mixing into shows or using as exit/egress music, and its planetarium compendium. The Nessies also have a growing catalog of slides and pans for $12.50 a slide — very nice stuff. (Among my favorites are the still the “with or without” constellation figures — that is, with or without clothes depending on the sensibilities of your audience) Loch Ness offers their product catalog on CD-ROM as well as in hard-copy form.

Upcoming offerings include a show called “Oceans in Space” commissioned for the Springfield Science Museum in Springfield, Massachusetts and narrated by Avery Brooks of Star Trek: Deep Space Nine (look for it perhaps by next spring); Mars Quest which is the planetarium component of a traveling exhibit on Mars and is available to exhibitors at present (the show may become generally available by next summer or fall); and a new, updated, and possibly expanded version of Hubble Vision tentatively titled Visions of the Universe slated for production next year.

You can contact the ever-busy Nessies at P.O. Box 1159, Groton, Massachusetts 01450 USA, telephone +1 978-449-3666, fax +1 978-449-3799, or through their web site, address given above.

From Sudekum Planetarium came another show presentation titled Lunar Odyssey, which used the pretense of a futuristic trip from Earth around the moon to examine the mythology, history, geology, origin theories, and future prospects of Earth’s nearest neighbor in space. The 43-minute show featured a nicely-varied Mark Mercury score, a charmingly primitive artistic style, a good number of video clips, and lots and lots of lunar information. My only real quibble is a consistent mispronunciation of the word “mare” (not a lady horse but a lunar sea); otherwise, it’s a solid astronomy show. The program can also be had in a 37-minute version, comes with an educator’s guide, and is described in the Sudekum brochure as being suitable for grades 4 and up and family audiences (with which I agree). The cost is $675 U.S. and includes script, about 370 slides, and video clips.

Lunar Odyssey is just one of many Sudekum shows available for purchase, many of them advertised in its “Cosmic Blab” brochure. For more information and/or a copy of the brochure, contact the Sudekum staff at the Cumberland Science Museum, 800 Fort Negley Blvd., Nashville, Tennessee 37203, telephone +1 615-401-5077, web site www.csmsifun.com.

From Buhl Planetarium came yet another show performance, this one on the search for life in the universe. In fact, it was called The Search for Life in the Universe, and featured none other than the voice of Mr. Spock himself, Leonard Nimoy. He did a very nice job going all of the places you’d expect a show like this to go, touching on SETI, UFOs, cosmic alchemy, recent evidence of extrasolar planets and planetary systems, and the Drake Equation and all of its implications, with lots of appropriate imagery and lots of video as we’ve come to expect from Buhl. Nicely done.

For information on price and show kits, or a copy of the show kit demo on CD-ROM, contact the Jenny Pon at the Buhl Planetarium, Carnegie Science Center, One Allegheny Avenue, Pittsburgh, Pennsylvania 15212, telephone +1 412-237-3327, fax +1 412-237-3395, e-mail poni@clpgh.org.

From Bishop Museum came Ken Miller bearing news of The Explorers, the program on Polynesian navigation which is the first product of Bishop’s NASA-funded Explorer’s Project. He ran the crowd through taped excerpts of the show and guided us through the live sections in which we identified the unmoving North Star and used our hands as measuring devices to navigate by the stars between the latitudes of Hawaii and Tahiti. Ken reports, alas, that his 170 copies of the free show are all sent out, but they have many more requests and are investigating ways to make more copies. Also, watch for the second show which should become available next year, this one on the work of the giant telescopes atop Mauna Kea.

For more information on show availability, contact Mike Jones at the Bishop Museum Explorers Project, 1525 Bernice Street, Honolulu, Hawaii 96817, telephone +1 808-847-8203, e-mail mjones@bishopmuseum.org, or check out the project at web site www.bishopmuseum.org/bishop/planet/ips.html.

From the Minneapolis Planetarium came word of a whole series of shows developed there which are available to other planetariums. Four programs for Grades 1-3 and four programs for upper elementary grades to the general public cover a wide variety of topics from constellations and the moon to time-
keeping and the search for “ETs.” The newest addition is a holiday show called Winter Wonders running the gamut from the Star of Bethlehem to solstice practices around the world, available now. Coming next year are two more programs on the aurora and the solar system.

I missed seeing parts and pieces of the shows, but you can check with planetarium coordinator Rodney Nerdahl at the Minneapolis Planetarium, 300 Nicollet Mall, Minneapolis, Minnesota 55401; telephone +1 612-630-6152, fax +1 612-630-6180, e-mail RNERDAHL@prodigy.net. The shows run 30 to 35 minutes, and the $350 U.S. price tag includes soundtrack on audio cassette or compact disk, annotated script, 120 to 220 slides and activity booklet.

From LM Images came a sampling of the company’s lovely all-skies on the Dorrance dome. Imagery ranges from colorful abstracts and fractals, to medieval scenes and constellation charts, to assorted astronomical imagery including the Pathfinder Martian landscape, planet montages, nebulae, the radio sky, and the Hubble Deep Field North. Beautiful stuff. LM Images uses Digidome and Photoshop software to customize images to match dome diameter and projector configuration, creates slides with built-in soft-edge masking mounted in glass mounts, and can also do custom work on your own images and photographs.

Who can’t use more all-skies, when there’s such nice stuff out there? For more information, prices, and a copy of the catalog, contact Laura Misajet at LM Images, P.O. Box 948 Narberth, Pennsylvania 19072 USA, telephone +1 610-664-0308, e-mail lmimages@aol.com, web site members.home.net/misajet/lmimages.html.

From Lawrence Hall of Science’s Alan Gould came word of the newest entry in the PASS (Plantarium Activities for Student Success) series of audience participation programs: “Northern Lights.” This program, developed by the LHS folks in conjunction with Franck Pettersen of the Nordlys Planetarium in Tromso, Norway, will demonstrate seasonal differences on different parts of the Earth—one far northerly (i.e., Tromso) and one at your own presumably more southerly location — and will investigate the cause and appearance of the aurora.

Alan was looking for planetariums interested in field testing the program this winter, with feedback provided prior to next spring’s publication date. If you’re interested, you might check with Alan to see if he still needs more testers. Contact him at Lawrence Hall of Science, University of California, Berkeley, California 94720 USA, telephone +1 510-643-5082, e-mail agould@uclink4.berkeley.edu

From the Rocky Mountain Planetarium Association came copies of its new “Planetarium Primer,” a compendium of reprinted and commissioned articles from many familiar names in the business, covering virtually all aspects of our wacky profession. The publication was edited by Mike Murray, current RMPA president, and is touted as being not just for “beginners”; we older coots can learn (or be reminded of) useful things as well.

RMPA has decided to offer the publication as a benefit of RMPA membership on the premise that it’s easier for them to handle it that way and it’s cheaper for you if you want one. The cost of RMPA membership is $15 U.S. — and so that’s the cost of the book (with the bonus of other RMPA membership benefits — you even get to vote, no matter where you come from!). If you have questions of need more information, you can contact Mike Murray at the Museum of the Rockies, 600 West Kagy Blvd., Bozeman, Montana 59717, telephone +1 406-994-6891, e-mail mmurray@montana.edu.

From IPS’s past president Thomas Kraupe came a sampling of the new ESA video disk containing a wide variety of ESA-generated video, from Ariane rocket launches to a rendezvous with Mir to a number of computer animations, including the ISS and some really great Huygens stuff not all of which I’d seen before. Some segments are narrated in English, some in French. Some 70 minutes of footage selected from 40 betacam tapes has been crammed onto the double-sided laser disk. (Tape copies — probably VHS — can be requested.)

This is great stuff, not easily obtained by planetarians outside of Europe, and is being sold essentially at cost to IPS members for $95 U.S. with a non-member cost of $135. What a wonderful service! Thomas especially is to be commended for his hard work in producing this — and it’s just the first of more tapes to come. Some great Jet Propulsion Lab (JPL) sequences on planetary missions is waiting in the wings, for example. Thomas and President-Elect Martin Ratcliffe are taking the lead on these video products, so contact them with your inquiries. To obtain an order form for the ESA video, contact Treasurer Shawn Laatsch using the contact information on the IPS page of this issue (unless an order form has been stuck into this issue).

Also recently announced is a change in the distribution of slides and accompanying data sheets from both JPL and the Space Telescope Science Institute (STScI). Formerly, these materials were sent to affiliate reps for distribution. This system will remain in place for affiliates outside of the U.S. and Canada, but a more centralized distribution plan has been developed for the American and Canadian affiliates, President Dale Smith has announced.

IPS members in these regions can now subscribe directly to the slide service, whose first subscription period begins January 1, 2000. Bowen Productions will be the central distributor of the materials. The cost of a subscription will be $39 U.S. for IPS members, $59 for non-members. The subscription period will vary depending on the volume of slides coming down the pipeline, but is expected to be about nine months. Subscribers will be notified when the money has run out and it’s time for renewal.

Bowen will produce high-quality duplicates of JPL slides and will distribute first-generation Hubble slides provided by John Stoke at STScI. If you’re interested — and who can’t use these great images of current events? — you need to subscribe by January 15 to get in on the first subscription period. You may find a subscription form stuck in this issue somewhere. If not, check with any of the officers or your affiliate IPS reps to get one.

From the Space Telescope Science Institute’s John Stoke came a report on recent collaborations with the Maryland Science Center (the national Hubble Visitor’s Center is there), Space Link, and SITES (the Smithsonian Traveling Exhibit Service) to produce some traveling Hubble exhibits. He also reviewed current offerings: high-resolution images and animations, on-line educational activities, the advertising of opportunities such as the IDEAS grant program, and special events.

In addition to providing first-generation slides for the IPS distribution program, he also tantalized his listeners with possible projects for the future. These included annotated video compilations, special format slides, transparency masters for exhibits, the creation of a password-protected pre-news release web site for planetarians, a new public web site, and activities for the upcoming tenth anniversary of the Hubble launch (in April 2000) for which he is taking suggestions.

John also demonstrated a prototype product called Deep Cosmos — the first of a possible series of PC-based multimedia short presentations combining Hubble imagery with spare written script interpreting images and providing, in effect, short comprehensive lessons on some aspect of astronomy being investigated by Hubble. If STScI can provide a method for downloading such shorts to our computer systems, updated perhaps once a week, one could use the shorts to exhibits or as before or after bits in the plan-
etarium, continuously repeating.

The piece John demonstrated included some beautiful imagery of dense star clusters near the galactic core — things I hadn’t seen before. It’s a wonderful idea. If you think so,
too, you might check with John to get more information or to express support. You can reach him at the Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, Maryland 21218, telephone +1 410-338-4394, fax +1 410-338-4579, e-mail stoke@stsci.edu.

Whew! So much for a brief sampler. And this doesn’t even cover the gossip. Look for anything major that’s fallen through the cracks to appear next issue.

Mystery of the Missing Seasons - Guest Review

The following comes from April Whitt, who offers a “guest review” for a product that I can’t review myself for obvious reasons. Thanks, April, for contributing to this quarter’s column! Attend ...”

"If you’re looking for a seasons show for the third grade and family crowd, this is one to consider. Informative, entertaining, and well-illustrated, Mystery of the Missing Seasons is the latest offering from Bowen Productions. The program does as well correcting misconceptions as it does introducing vocabulary and supporting national science objectives.

“At the beginning of the program we are introduced to Angelo, a young man with a homework assignment: find some constellations and figure out why some are only visible during certain seasons. The appearance of two aliens (not zombies) looking for their planet’s missing seasons leads to a discussion of reasons for seasons on Earth.

“The script by Jim Manning is a good blend of facts and the silliness so relished by the eight to ten year old crowd. Art and sound by Bowen Productions complements the writing very well: bright colors, clever animation sequences and perfect voiceovers.

“Watching any planetarium program is a split brain activity for me — one cerebral hemisphere observing techniques and timing, while the other is lost in the story (if it’s a good one). Watching Mystery of the Missing Seasons one lobe was asking, ‘Could we run this show in our theater?’ Do we have the right projectors? Where could we put that cool purple spaceship? Could this run in a smaller dome effectively?’ While the other lobe was answering, ‘Yes, yes, in 408 and yes. This is a good one!’”

For pricing, show package details, and other information, contact Bowen Productions, 748 E. Bates St., Suite 300W, Indianapolis, Indiana 46202 USA, telephone +1 317-226-9650, fax +1 317-226-9651, e-mail bowenprod@aol.com, or check out the Bowen web site at www.bowenproductions.com/planetarium.

Planispheres Plus

Rob Walrecht, Fuutstraat 6, 3815 JP Amersfoort, The Netherlands, telephone/fax +31 033 47 55 543, e-mail walrecht@global.xs.nl is at it again, adding new products to his line of excellent planispheres.

“One of his most recent is his wryly titled “Anti-Millennium-Bug-Clock” or “Star Clock” which depends on no technology beyond the stars to tell time — so long as it’s dark out and you live in the northern hemisphere, preferably at a latitude where the Big Dipper is circumpolar. The product consists of two parts on a heavy paper stock (300 g two-sided sulphate cardboard). An 11 cm (4.5-inch) wheel displays the northernmost part of northern celestial hemisphere down to about +45 degrees declination (just catching Deneb and Capella and the feet of Ursa Major), with Polaris in the center and the northermost constellations around it. Around the outside of this wheel are marked the months of the year. This part fits onto a 12.5 cm by 17.5 cm (5-inch by 7-inch) card displaying a larger wheel which has the hours of the day (from 0 to 23) around the rim, with an indicator for the northern horizon. You put the two wheels together at their centers, the smaller against the larger (with some sort of rivet — don’t know if it’s included), and you end up with a mini-planisphere for the northern sky. Then go outside, turn the inner wheel to position the Big Dipper (or Plough) in correct relation to your northern horizon for the present moment, and read the time around the perimeter which corresponds to your current approximate date. Should civilization collapse on the stroke of midnight on December 31, you can still proudly tell the current local time on any cloudless night!

“It’s a novel, simple, and clever little device, and slips in a few useful sky concepts at the same time. It comes in Dutch and English versions, and would be a clever addition to your gift shop. According to his letter, the wholesale cost for 500 pieces is about $865 U.S., $1,000 for 1,000 copies, with greater discounts for larger numbers. One- or two-color models are available. Contact Rob as given above for specifics.

Walrecht also offers a simple punch-out sundial in thin PVC or laminated cardboard materials. It’s not a precision instrument, but does a nice job of illustrating the concept and is easy to put together. Costs run about $1,750 for 500 of the cardboard version, $1,150 for the PVC material version, again with greater discounts for larger numbers. They can be produced in one or more colors and in different sizes.

Rob also writes that he now has planispheres in Dutch, English, French, German, Norwegian and Danish, with plans for Italian and Spanish versions. He hopes to have a new southern hemisphere planisphere ready in time for next year’s IPS conference in Montreal. I really like his planispheres; they’re attractive with the bottom wheel showing white stars against a blue sky with the Milky Way a lighter blue and the upper wheel with the transparent window and hours a contrasting red and white. The devices include declination and right ascension grids, a meridian line, a way to estimate altitudes, and brief useful information on the back. I don’t have current pricing information, but in the past, these planispheres have wholesaled for a little over $5 U.S. apiece.

New International Dark-Sky Association Handbook

The IDA Outdoor Lighting Code Handbook will be available in its first version very soon. Watch the IDA web site at www.darksky.org for notification of the publication.

The handbook will include extensive discussion of issues relating to the design, implementation, and enforcement of outdoor lighting codes, and will include new ideas addressing some of the currently pressing issues of community light pollution control, such as service station canopy lighting and sports lighting. Included is a Pattern Lighting Code that can be used as a template by communities seeking to draft or update their lighting codes. The handbook will guide users through the process of modifying the Pattern Code into a lighting code suitable for their community based on the communities values and concerns.

This project is the result of a concerted IDA effort that has included input from those most familiar with the issues of lighting codes, both technical and practical, as well as professional lighting designers and engineers. The Pattern Code is based on American County/City lighting codes and legal structures; the issues are universal, however, and the handbook should provide some assistance to anyone concerned with outdoor lighting wherever they are located.
Astronomical Data for 2000

Assuming the doomsayers are wrong and there'll still be a world to deal with when we rouse from our New Year's hangovers, Roger Mansfield (obviously an optimist) of Astromon­

al Data Service is offering a new year's worth of his excellent custom sky references which can help with your own observing as well as answering those pesky inquiries about what's going on in the sky and when. And they're all reasonably priced. Here's a quick sampler.

Skywatcher's Almanac 2000. This pub­

lication is computer-generated for your precise latitude and longitude, and offers the time of rise and set for the sun and moon on your locality on every day of the year. The refer­

ence includes the percent of illumination for the moon at rise and set as well, and provides information on the year's eclipses, occultations of bright objects by the moon, planeto­

ry visibility and phenomena, star maps for reference, lists of the constellations and bright stars, and a glossary of explanations. I've used this publication on many occasions and it's an awfully convenient reference to have. Attractively presented and spiral-bound at the top, it sells for $18 U.S. using dot-matrix printing, or $20 U.S. for a laser-printed version.

Local Planet Visibility Report 2000. This one provides useful data on the planets, again computed for your latitude, longitude, and time zone. For the five naked-eye planets, the information includes, at two- or five-day intervals, right ascension and declination (plus a star map on which to locate these positions), heliocentric ecliptic longitude and latitude, phase angle and elongation from the sun, distance from the sun and the Earth, apparent diameter, apparent visual magnitude, and rise/set times. The refer­

ence also offers basic position information for the three outermost planets. Brief observing notes are included as well. Spiral-bound on the side, this publication sells for $15.

Comparative Ephemeris 2000. This is a day-by-day ephemeris for the sun, moon, and naked-eye planets, providing celestial coordinates for the seven moving sky objects in side-by-side columns for ready reference — for when you want to know where they are in the sky or to check their accuracy on your planetarium dome. The reference gives right ascensions and declinations for all seven, as well as geocentric ecliptic coordinates for the sun and moon and heliocentric ecliptic longitudes for the five planets. After the tables you'll find a user's guide providing explanations of the various coordinates and useful tips on how to find the planets, how to set up an equatorial telescope and locate the planets with the setting circles, and how to calculate the approximate times of certain celestial phenomena such as new and full moons and planetary conjunctions and oppositions. Spiral-bound at the top, it goes for $12.

Photographer's Almanac of the Sun and Moon 2000. Once again computed for your location and time zone, this publication con­

tains information on the sun and moon useful for the "landscape photographer" — but I've also found it mighty useful for me in making observing plans. This reference provides, for every day of the year, the time and azimuth (that is, location) of sunrise and sunset, the same for the moon, the time of local noon and the moon's altitude then, the per­

centage of the moon's face illuminated at moonrise, and the times of the beginning of morning twilight and the end of evening twilight. (In this reference, twilight is defined as the moment when the sun is nine degrees below the horizon, which puts the time, both morning and evening, midway through "nautical twilight" when the sun is between six and 12 degrees below the hori­

zon. Roger writes that "it is useful to think of mid-twilight as marking the time when the planets and bright stars can first be seen (in the evening) or can last be seen (in the morn­

ing)."") Spiral-bound on the side, this refer­

ence sells for $20.

What A Deal ... I'm especially partial to the first and last of these references, but every one is an excellent and handy publication to have nearby during the year as we do our work. In recognition of this, Roger also offers a "Forecaster's Special 2000" in which all four publications are offered for $60 — a $7 discount on the total price of the four if pur­

chased individually — including a bonus of three 11-inch by 17-inch (28cm by 43cm) star maps, one a rectangular map of the full sky, the other two equidistant projections of the north and south celestial spheres down to declination 45 degrees. And all of Roger's publications are free of Y2K problems!

The year 2000 is fast approaching, and these are handy references to have. For more information, a catalog, or to order, contact Roger Mansfield at Astronomical Data Ser­

vice, P.O. Box 26180, Colorado Springs, Colorado 80936 USA. Since three of the pub­

lications require custom computing based upon your location, Roger says to allow a minimum of three to five working days to process and check your order.

ASP Catalog

Still shopping for the holidays? You might consider a browse through the fall/winter 1999 catalog from the Astronomical Society of the Pacific, 390 Ashton Avenue, San Fran­

isco, California 94112 USA. It's perfect for the astronomically-inclined, and as always, there are new items to choose from — including a remarkable new poster sporting both of the Hubble Deep Field images, a brass spy­

glass-type telescope, a "nocturnal star dial" on a chain which uses the positions of the North Star and the Big Dipper to tell night time, a holiday Earth globe ornament, a book of Apollo moon images called Full Moon, another on The Planets, and another on The Invisible Sky featuring x-ray imagery, a wearable sundial on a cord, new videos, globes, constellation books, toys, CD-ROMS, an inflatable Mars ball, and more. You can now order on-line at www.apskyy.org, by fax at +1 415-337-5205, or by telephone (+1 800-335-2624 in the U.S. or +1 415-337-2524 from outside the U.S.) Or contact the catalog department at the address given above.

Changes

When the clock strikes midnight on December 31 and all of the computer tumb­

lers come up double zero, our profession will be the poorer. For after a quarter-century of working among stars and wax, Undine Concannon will be retiring from the Lon­

don Planetarium/Tussaud's at year's end.

Not only has Undine distinguished herself as one of just a handful of female heads of major (that is to say, big, technically sophisti­

icated, metropolitan) planetariums, leading a talented team doing some great program­

ming and seeing the planetarium through a major renovation (and just recently receiv­

ing her just desserts in the form of a national award bestowed by the queen herself), she has also contributed very significantly to our profession through her service as a long­

time IPS Council member representing British planetariums, in a stellar turn as IPS Publications chair during which she revived the notion of special publications, and of course, as host of last year's marvelous and innovative IPS conference in London. She will be sorely missed not only by her staff, but by all of us who respect her talent and professionalism and appreciate her wit.

Lest this start to sound like a eulogy, let me simply offer her my best wishes in all of her new adventures, with the hope that she won't be too busy to stay in touch. So, Undine, is it Everest or the English Channel?

Finally ...

See you all on the other side of Y2K. Have a pleasant holidays and a great start to the last year of the old millennium (for us stick­

ers, anyway). And as always, what's new? ☆
Only a passing glance from most visitors. It could pass for a large pocket watch. But the modest label H4 gives away the watch's secret. It is the fourth chronometer built by John Harrison, a determined clockmaker from Yorkshire who spent a generation perfecting his ongoing timepiece. Step by step, he whittled down the size of his chronometers, and step by tortuous step he fought the factors that would steal away their accuracy — the roll and pitch of the ship, the corrosive appetite of the salt air, the expansion and shrinkage of the parts as the temperature rose and fell. He beat them all and claimed the prize — £20,000 (today, $12 million) — the British Admiralty had posted for the first device that could keep accurate time at sea and tell the ship its longitude. (The jealous Astronomer Royal fought the award, and only with the personal intervention of King George III a decade later in 1772 did Harrison finally receive his money. US readers may recognize this science-friendly king as the tyrannical sovereign against whom the American colonies rebelled just four years later)

Today, H4 resides in a display case at the Royal Greenwich Observatory barely a stone's throw from the Prime Meridian of the World. Here is the fiducial line from which the time of planet Earth is measured, though we take the liberty to call this prime time Universal. The Prime Meridian line rolls out ever so carefully from a stately structure whose outside wall holds an electronic clock counting down to the change of millennia. The RGO web site explains it all, just as we explain it all ("all" meaning when the millennium really changes), but the clock counts down to January 1st of, well, you guessed it, 2000. Just as the big electronic board on the Eiffel Tower counts down des jours in Paris, the city that once contested with the British for custody of the prime meridian.

Across the Atlantic, another exhibit pulls

Quasi-millennial light: the rest of the world

Now the prime meridian, fiducial line though it is, won't see first light in the year 2000 because the International Date Line is halfway around the world bisecting the Pacific Ocean. So who will see first light?

Let's start with the 48 US states. American readers will surely want to know which place in their land first sees the fresh light of 2000. We all understand that the calculations to determine just where this quasi-millennial dawn breaks earliest must factor in longitude and latitude (remember that Jan. 1 is near the solstice and altitude. Okay, those calculations are well defined. The result is a place in Maine. Maybe Cadillac Mountain near Bar Harbor. Maybe Porcupine Mountain near Lubec. But you can't tell between them because there is another factor — refraction — whose effects vary from day to day in an unpredictable way and muddy up these precise calculations by up to 30 seconds. And we know this on good authority from US Naval Observatory spokesman Geoff Chester, who many will remember from his planetarium days at the National Air and Space Museum in Washington, D.C.

But who's first in the whole world? That should be easy. Who is closest to the International Date Line on west side, after you remember to fold in effects of latitude and altitude? But, what about Daylight Time? — after all, it's summer Down Under, and all those astral clocks will be turned ahead an hour. Next, take a look at an atlas, and see all those twists where the Date Line crosses over noon. Next, take a look at an atlas, and see all those twists where the Date Line crosses over noon. Now the	...
two full time zones eastward, and wrapping all of its islands together in the same day. And in the process making a great frog’s leap over the competition to greet the third millennium first. You can check out the August issue of the magazine Islands to get the whole story.

Who will be last to see 1-1-2000 light? That one is easy and unambiguous. There is only one place where the Date Line skews west of the 180th meridian, and that’s in the north Pacific to keep the westernmost Aleutian Islands on the same day as the rest of Alaska. So the prize for last goes to Attu Island, the most western and most remote of all the Aleutians. Due north of New Zealand, Attu is the most western and most remote of all the Aleutians. Due north of New Zealand, Attu is home to a small year-round contingent of the US Coast Guard and in the month of May to a hardy band of birders. The 24 stalwart Coasties will be the very last to see the dawn’s early light on January 1, 2000.

**Quasi-millennial light: us**

Finally, what about us? Who is first and last among planetariums? A few minutes with the IPS Directory of the World’s Planetariums and a map unearths the answers. The world’s easternmost planetarium is the 6-m Holt Planetarium in Napier, New Zealand. But no IPS folks there. The easternmost planetarium with an IPS member is the 11-m facility at the Auckland Observatory under the leadership of Jim McPhillips. You can check out their web site at www.stardome.org.nz to see a picture of this facility and you can learn more about New Zealand’s millennial sunrises at www.rasnz.org.nz/MillSunR.htm. The last IPS planetarium up for 1-1-2000 light is the Bishop Planetarium in Hawaii, home of the Explorers project and led by IPS veteran Ken Miller and present on the web at www.bishop.hawaii.org. But the prize for the planetarium which must wait the longest of all to see sunlight on January 1 must go to the one in St. Michael, Alaska, which shivers through the winters near the mouth of the Yukon River on Alaska’s west coast a spell south of the Arctic Circle but barely east of a frozen Date Line.

But wait a minute! Which planetarium is really the last to see sunlight in the year 2000? Sorry, Pacific sites. It’s the Northern Lights Planetarium in Tromsø, Norway, up there at 69° north and braving another sunless winter. Anyone watching from the enclosed observation tower above the planetarium won’t see the sun again until just before noon on January 13.

**Arctic Sundial**

That’s about the same date the Sun will make its 2000 premiere to the hardy folks in Cambridge Bay, Canada, which like Tromsø sits about three degrees north of the Arctic Circle. And just as Tromso is home to the world’s northernmost planetarium, Cambridge Bay is home to what must be one of the world’s northernmost sundials. You can find it just a stone’s throw from the many Pebbles could check out the gnomon’s shadow pointing south. My own light night efforts were frustrated as both mid-July midnights I spent in Cambridge last summer were cloudy and shadowless.

But still I was intrigued to find a sundial built for a round-the-clock sun, and was reminded of the fascination my own classes and audiences at home find with demonstrations of a sun that does not set.

**To want to watch the sky**

If you want to slow down the pace of time and make a starlit night that almost never ends, you can do one of two things. You can run your diurnal motion at half-speed, or you can take the overnight flight from Cape Town to Miami. Frequent fliers will recognize that a westbound overnight flight must be a long one, and this one surely is. You are in the air for 14 hours non-stop from take off to touch down. You have plenty of time to eat, sleep, read—and stargaze. If you ever take this flight, get a left window seat, use your blanket as a light shroud, and look up! At 39,000 feet (11,800 meters), the sky is a sure bet to be clear, and near the equator, it may be a bit of a puzzle too because your field of view is limited to the southwest by the window. After some bewilderment my northern eyes pulled Ara out of the black, then slowly, ever so slowly, Scorpius crawled into view and crept toward the horizon, followed in suspended animation by Sagittarius, wrapped like his quarry in the bright band of the Milky Way. The pursuit went on at only half the normal speed, as our westbound plane slowed down the pace of time. It took the better part of the Atlantic Ocean and a good clip of eastern South America for the sea to swallow the hunter and prey.

A week earlier I’d followed the celestial chase from the ground, safely afoot in South Africa and Zimbabwe. Here Scorpius climbed to the zenith, and in the premillennial August skies, red light of Ares shone not far to the west of its rival light, Antares. The Crosses too were where they belonged, the Southern Cross to the southwest and the

24-hour sundial at Cambridge Bay, Canada (69° north latitude)
Northern Cross low in the north. I explained the overhead arch of the Milky Way to my fellow travelers — volunteer victims of a star talk given by a planetarian who couldn’t leave his work at home — and together we found the young light of Alpha Centauri that none of us could see back home.

As my new friends went back to the lodge (and lights), I realized that over the course of two or three nights, more than half the tour group had followed me into the dark. None of the Andromeda Galaxy before turning to like lier, they had turned between the two great Venus would have graced the evening sky, much skywatching before. This was not a preselected group of people who had decided to come to a planetarium show. They were just folks on a tour group and many were from big cities where there is no sky, almost. Yet there was an interest waiting to be tapped — not at the moment by the media-rich shows we work so hard to deliver — but by the simple prospect of looking at the sky while someone talked about it for a few minutes.

It is this sky that lies at the heart of what we do. This sky is why we spend so much money for those projectors that anchor the centers of our planetariums. Perhaps we cannot persuade our audiences to stargaze from 7 miles (11 km) up, but we can try to inspire them to watch the sky from wherever they are. And if they do, they may find a sense of what drove the first stargazers — and stargazers in 999 — and us.

Then the alarm went off at 4:30 am. I wanted to hit the snooze button — this was vacation, after all — but a few minutes later I stood outside surrounded by a ring of pearls from a “January evening.” Achernar anchored the southern sky, Canopus lay to its left, then came Sirius, Orion, Aldebaran, Jupiter and Saturn, and finally Fomalhaut in the west. The “M” of Cassiopeia hovered barely above the horizon in the north; aimed above the queen, my binoculars pulled in the light of the Andromeda Galaxy before turning to the LMC in the south, just as a few hours earlier, they had turned between the two great globular clusters, Centauri and M13.

A stargazer in January of the year 1000 would have seen a slightly different sky. The stars of course would have been the same, but the planets would have shifted. Mars, at opposition, would have lit the sky all night. Venus would have graced the evening sky, like Saturn, and Jupiter would have risen just before dawn. Pluto, though our medieval friend could not have known of it, would as now have been near perihelion, and also then as now unfelt by all the astrologers.

The sky in 1000 would have been different in another way as well: It would have been darker than it is today. Let us hope that in the year 3000 the sky will be darker again and that planetariums, or whatever unimagin-
Now I'm sure that Tony never thought of this image as the peak picture in the show - certainly not in the show as this grateful private audience of one would see it. None of us can tell ahead which images or words in our shows or lessons may strike an especially resonant chord with someone in our audience or class. But it happens, and to help make it happen is why we are here.

We have at our disposal an arsenal of equipment from slide projectors to star projectors to immersive video that would have seemed quite magical to a star teacher in 999, and rather amazing even to the first plane-tarians in 1923. Yet our goals are the same — to touch the people who come to us with a sense of wonder and excitement about the star-filled sky and the universe beyond it that our "enhanced vision" is revealing. We have little idea what incredible tools our successors in 2999 will have at their disposal—ours will seem museum pieces to them—but perhaps the one safe bet — and hope — is that they and we will share this common vision that strives to touch our fellow humans wherever they may be.

**Nordic notes**

A month later winter had become summer again, and the Nordic Planetarium Association convened for its 1999 meeting in Tampere, Finland. Timo Rahunen was the gracious host as a small but very international group assembled in his planetarium at the Sarkanniemi theme park. The Swedes and Finns were joined by planetarians from nearby Estonia, Lithuania, and Russia, and by this one planetarian from the distant USA who brought the greetings of IPS to our busy northern members. NPA president Lars Broman showed plans for his new planetarium in Teknoland, an emerging scientific theme park in Sweden. Jaak and Helle Jaaniste from Tarku, Estonia and Giedrius Straizys from Vilnius, Lithuania described work at their respective planetariums in the Baltic countries; see the Nordic section of the International News in this issue for the full text of their reports. Vadim Belov from the planetarium in Nizhny Novgorod, Russia gave an extensive illustrated report on work at this facility which celebrated its 50th anniversary last year; look for this report as an article in the March issue of the *Planetarian*. Sakari Lehtinen from Helsinki described his innovative work with a trio of portable planetariums. Other speakers described their expeditions to the August solar eclipse and shared their excitement and images with us homebodies who were less fortunate. Timo ran a pair of his planetarium shows filled with many of the exquisite video animations he has created and then concluded the meeting with a helpful video production workshop. I would be remiss not to mention our meals: two lunches in a revolving tower-top restaurant just an elevator ride away from the planetarium and a buffet dinner at a lakeside sauna in the forest a few miles (km) outside of Tampere. You can read more about this meeting in this issue’s International News, but it’s quite safe to report here that our profession is alive and well in the lands near the midnight sun.

En route to the meeting, I spent a day in Stockholm as a guest of Tom Callen and Marianna Back. Tom is chair of the IPS web subcommittee and producer at the Cosmonova Planetarium, whose construction at the Natural History Museum was just starting when the IPS post-conference tour visited there in 1990. Marianna was a co-host (with Lars Broman) of that 1990 meeting in Borlänge, Sweden, the first IPS conference in Europe.

En route home, while my colleagues taught my classes, I made the rounds of some of Denmark’s planetariums, beginning with a pleasant visit with Bjørn Jorgensen, director of Copenhagen’s Tycho Brahe Planetarium, where the Omnimax films are followed by live startalks. Later, Ole Knudsen at
Abstracts and titles from the 1999 issue of *Planetariums*
published by the APLF (Association des Planétariums de langue française)

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**Naçay: Radio Astronomy at Its Best**
Florent Bailleuil, Head of Espace Ciel Ouvert, Naçay

Some new equipment at the radio observatory in Naçay will permit astronomers
at the Paris Observatory to push the limit in the centimeter radio band.

**The Cappelle la Grande Planetarium**
Stéphane Colsenet, Director of the Palais de l'Univers
The change in development projects for the planetarium involves strategies for
the public as well as the creation of networks and European partnerships. The
emphasis is on pedagogical action.

**Library of the Stars**
Philippe Dagneaux, science journalist
Panorama of the recent publications. (Book reviews.)

**The Sky on the Computer**
Philippe Dagneaux, science journalist
New releases on CD-ROM. The test bench.

**The New Planetarium at La Hague**
Jean-Pierre, Dupont Vice-President of the La Hague District
1999 is an extraordinary year for La Hague. Cotentin is the first point of contact
on the Continent for the August 11 eclipse. A decisive argument to promote a
planetarium project integrated into an astronomy museum complex. Raise the
curtain!

**The Montpellier Planetarium: A Dream Becoming a Reality**
Jean-Michel Faidit, Editor-in-chief of Planetariums
Didier Basset, formerly of the Palais de la Découverte
Ten years after the transformation of the former Observatory at the Jardin des
Plantes into a school planetarium, the project for a large planetarium in the city
where this journal is published takes form.

**Conception and Writing of Planetarium Shows**
Animated workshop by Professor Tony Fairall
During the IPS meeting in London in July 1998, an animated workshop by Prof.
Tony Fairall, Planetarium Director at the South African Museum in Cape Town,
discussed the conception and writing of planetarium shows. Because of its inter­
est, this text (created with Margie Walter) has been translated by Philippe Huyard
of the Planétarium de Saint-Etienne.

**The Planetarium of Bretagne: Almost a Year...**
Claude Ganter, Director
This article covers the changes brought to the planetarium since the installation of
some very innovative equipment in June 1998, which introduced all-sky video to
France. A tale of technological adventure with a capital A!

**The Concept of Planetarium Show**
Philippe Huyard, Planétarium de Saint-Etienne
Use of the starry sky, informative image content, progression of rhythm and form.
The idea of a planetarium show proceeds from a particular reflection on the audi­
ence and its development.

**Eclipse 99—Digital Imagery: How and Why?**
Serge Kouchmy, Institut d’Astrophysique de Paris
The study of total eclipses allows for better understanding of the internal and
external solar corona. A quick look at current research and techniques put into
practice.

**Space News in 1999**
Jean-Yves Marchal, Planétarium de Strasbourg
1999: An exceptional year in astronomy and space, 1998 was a year of new suc­cesse: the qualification of the European Ariane V heavy-lift booster, the first
assembly of the elements of the International Space Station, launch of a new
probe to the Red Planet. . . 1999, eve of the year 2000, offers us a rendezvous of
the Sun and Moon on Wednesday, August 11, the last total solar eclipse of this
century.

**The Planetarium of Vaux-en-Velin: The Sky is for Everybody ... Seven Days a Week**
Patrick Millat, Planetarium Director
The Vaux-en-Velin Planetarium is a pedagogical tool whose first priority is edu­cation and culture: the multimedia astronomy shows give a popular and playful
dimension to astronomy education. New astronomy courses this year.

**Digistar Users Group Conference (September 24-26, 1998)**
Marc Moutin
Planetarium, Cité de l’Espace, Toulouse
Each year, Digistar users get together to talk shop: Digistar function, mainte­
nance, programming, technical developments, and computer technology. These
meetings are the occasion for Digistar users to present their graphical creations
to and network.

**The Frequency of Solar Eclipses in France**
Patrick Rocher
Institut de Mécanique Céleste et de Calcul des Ephémérides, BDI
Total solar eclipses are hardly numerous in a county the size of France, and if we
limit ourselves to a specific city or region, they become exceptionally rare. The
following table lists solar eclipses that cross France, from the beginning of the
16th century to the end of the 21st.

**What’s New at the Palais de la Découverte?**
Denis Savoie, Head of the Planetarium
The Planetarium at the Palais de la Découverte notes a sharp increase in the num­ber of visitors. New developments in astronomy in perspective.

**The Renovation of the Strasbourg Planetarium**
François Schnell
During the last two years, the planetarium has been progressively transformed.

**Planetariums in Germany**
Andreas Scholl
Cradle of the modern planetarium, Germany is the European country with the
most facilities—eighty-five. A tourist view.

**About the Eclipse: Shows and Events**
On August 11, 1999, a total solar eclipse will cross France. Such an event hasn’t
happened since February 15, 1961. The next eclipse will be on November 5, 2059,
but it will be annular—the next total eclipse is September 3, 2081. Special
shows, meetings, exhibitions, observations, and television programs accompany
this rare phenomenon, a sign of widespread interest. Here are the events that have
been brought to our attention.

**Albert Pla and His Mobile Planetaria**
Driven by a devouring passion, for several years Albert Pla has brought original
contributions to both inflatable domes and to projection systems, marking the
resurgence of inflatable domes in Catalonia and the rest of Spain.
Catalog of Planetarium Programs
Planetarium programs are of two types: pre-recorded or live. It is natural then that this catalog covers both types. Pre-recorded programs are listed thematically with other information on production and usage, and a list of planetaria which showed them in 1998. Live programs are grouped by facility. Shows for school groups only are listed separately from public programs.

Ephemerides 1999
List of astronomical events.

The 14th IPS Conference
Chronicle of the international meeting.

General Assembly of the Association of French-Speaking Planetaria
(Notes on the APLF conference.)

IPS '98 in Images: A Souvenir Album
Miscellaneous images.

IPS '98 in London
(Photos from the conference.)

The Megastar of Takayuki Ohira
A mobile planetarium projector with a million stars! A heady challenge, but thanks to specially-developed laser lithography, the result is stunning: beautiful, star-filled skies. These projectors offer the opportunity to create dark skies in the middle of a city. News on the young constructors.

News from Francophone Countries
Quebec: The Astrolab of Mont-Méga:anitic.
The Planetarium of Tunis.

Every year, IPS Council meets for two days to examine the current state of the world's planetaria. Account of the meeting.

Observing Planetaria
Approximately 1.2 million visitors in French planetaria in 1998. An overall increase in visitors due to a strong showing by the Palais de la Découverte and to the opening of new planetaria. A decrease in school visitation.

Planetarium Gazette
Planetarium chronicle. Meetings. Events.

Resource List for Planetarians
This list covers diverse resources available to the planetarium community. Advertisement is not implied. Separation into categories is according to fields of activity. Companies and groups wishing to be included in it are asked to contact the editor. Despite our best efforts, there may be errors in this list. If you find one, please notify us.

(News items from small domes and portables.)

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**STARLAB Planetarium . . . The Portable Universe**

Many of you, in planetariums worldwide, already know how easy it is to incorporate a STARLAB into your existing planetarium programs. Because of its versatility, portability, ease-of-use, and cost-effectiveness, the STARLAB is considered an invaluable and exciting multicultural tool for education. STARLAB can be used in conjunction with a fixed planetarium for:

- school outreach
- training programs
- multicultural education
- workshops
- special events
- community outreach
- hands-on education
- public relations
- teacher training
- fundraising

Visit our Website at <www.starlab.com>
or contact us for free information about the STARLAB Portable Planetarium.
Return to Strasbourg

Another regional conference turned international had convened four months earlier in mid-May in Strasbourg, France. A joint meeting of the APLF (Association of French-speaking Planetariums) and European portable planetariums attracted dozens of French planetarians and colleagues from England, Norway, the Netherlands, Belgium, Germany, Switzerland, Slovakia, Italy, Portugal, and Spain, as well as two of us from the United States: Susan Reynolds, chair of the IPS Portable Planetariums Committee, and myself. Superbly organized by APLF president Agnès Acker and her co-workers, the conference sessions met in the prestigious Council of Europe building, the same site where the IPS Council had assembled two years earlier.

The many papers by French planetarians were abuzz with the excitement of reporting new or freshly renovated facilities and of describing new exhibits and outreach programs. Other papers set out plans for the August solar total eclipse, the first to cross France since 1961. The meeting continued with a wealth of papers describing the creative work in portable planetariums across Europe.

We received fresh copies of the 1999 volume of Planetariums. This is the annual French-language planetarium journal inaugurated in 1995 and so ably edited by Jean-Michel Faidit. Abstracts translated from the 1998 volume appeared in the June issue of the Planetarian, and abstracts from the 1999 volume can be found elsewhere in this issue. Thanks to Dennis Cowles of the Louisiana Nature and Science Center in New Orleans for doing the 1999 translations.

Since he could not claim his rental car, successive weekends thereafter took me (with a renewed license!) to Flagstaff, Arizona to make arrangements for October Council meeting at Lowell Observatory, to Chicago for part of the AAS Centennial meeting, and to Montreal for a weekend with Pierre Lacombe and his busy IPS 2000 conference team. After flying to SEP in late June, the ASP Toronto conference beckoned in early July and was piggybacked with a 3-day workshop organized by John Percy on amateur-professional partnerships in astronomy.

At the workshop, an international mix of leading amateur astronomers (and their leaders such as AAVSO's Janet Mattel), educators, and a few planetarians exchanged perspectives and talked about ways for further cooperation. A panel organized by past IPS president Bill Gutsch ably explained the role of planetariums large and small in astronomy education.

Not all the conversations and contacts at these meetings make for interesting reading in a message such as this, but many have led to continuing efforts whose results you'll see in the coming months, and I'll list just a few here:

- initial contacts with additional sources of images for the IPS slide service
- talks with SEP's George Fleenor about IPS-SEPA cooperation in distributing the DistriKun planetarium show SEP is producing
- recruitment of volunteers for IPS work
- planning talks with several IPS committee chairs
- planning session for the next editions of the IPS Directory of the World's Planetariums and the IPS Resource Directory
- requesting Planetarian articles from some planetarians in their areas of expertise
- contacts that may lead to formation of regional affiliates in some areas not presently served

So you get the idea. IPS is a busy place. Some efforts lead to quick visible results (such as abstract exchanges), some are longer-term efforts (such as developing new regional affiliates), and some are behind-the-scenes efforts (such as strategies for enhancing our Directories). All the work accomplished by IPS or by any of the regional affiliates depends on the hard work of many dedicated people. You can help too. When we all work together, we all become better planetarians, and helping that happen is what IPS is all about.

One conversation bears special mention. At the AAS meeting, I had the great pleasure of running into Dr. Jordan Marché, who many of you will remember from his days as planetarian at Franklin & Marshall College and as editor of the Planetarian for five years before passing it to John Mosley in 1987.
Résumé de quelques articles publiés dans la revue
The Planetarian au cours de l’année 1998

L’utilisation de lentilles grand-angle dans un planetarium
Frank Andrews, Richard Hall et Wayne Orchiston
Carter Observatory
PO Box 2909
Wellington, New Zealand
Wayne.Orchiston@vuw.ac.nz
Nous présentons l’utilisation de lentilles grand-angle dans des projecteurs à dia-
positives au Carter Observatory’s Golden Bay Planetarium. Nous décrivons
egalement les positions respectives de ces projecteurs spéciaux dans le théâtre et
leur couplage avec les projecteurs standards pour réaliser des effets visuels
dynamiques et spectaculaires.

Aniara: À propos d’épopée spatiale et de son auteur
Aadu Ott
Batsmansv 11
SE-433 64 Partille, Sweden
a.ott@swipnet.se
Lars Broman
Stangiårnv 132
SE-791 74 Falun, Sweden
lbr@planetarium.euromail.se
Pendant plusieurs années, Harry Martinson a eu l’intention d’écrire une histoire
concernant le voyage d’un vaisseau spatial dans l’espace. Il désirait par là écrire
une histoire de la vie sur Terre avec ses promesses et ses aléas. Le poème nous
rappelle que nous, habitants de la Terre, possédons toujours un endroit pour vivre
et prospérer, à l’opposé des malheureux voyageurs condamnés à vivre à l’
intérieur du vaisseau Aniara. Le récit décrit leur voyage dans l’espace, non
seulement celui qui entoure le vaisseau, mais aussi l’espace intérieur de chacun
des voyageurs.

Symposium international sur les échanges en astronomie entre la Chine et
les autres pays: un compte rendu
Dale W. Smith
Dept. of Physics and Astronomy
Bowling Green State University
Bowling Green, Ohio 43403 USA
dsmith@newton.bgsu.edu
Au mois de septembre 1997 j’ai représenté l’IPS en Chine au mois de septembre
1997, dans le cadre d’un congrès commémorant le 555ièmes anniversaire de
l’ancien Observatoire de Beijing. Ce compte rendu décrit le symposium, résume
quelques-unes des présentations orales qui y ont été faites et relate nos diverses
aventures en Chine. La recherche astronomique et les planétariums en Chine sont
très actifs et bien supportés par les autorités.

Promotion des planétariums 101: une introduction au marketing pour les
professionnels des planétariums
Christopher S. Reed
CSR Media
12106 West 75th Lane
Arvada, Colorado 80005 USA
J’ai écrit cet article en tenant compte de mon expérience professionnelle dans les
médias, et en tant que partenaire intéressé par le milieu des planétariums, et en
essayant de vous aider à promouvoir votre institution. Il est rassurant de constater
que la promotion et la publicité peuvent être très efficace, peu importe la somme
d’argent qu’on y consacre.

Le Monty Phyton, Barnum and Bailey, super deluxe planétarium du futur
James G. Manning
Taylor Planetarium
Montana State University
Bozeman, Montana 59717 USA
J’aimerais vous offrir, pour votre réflexion, une vision d’un planétarium du 21ème
siècle. Peu importe comment les choses évolueront, la beauté du ciel étoilé sus-
citera toujours l’émouvante de l’homme. Des questions seront posées et des
réponses sollicitées. La clé de notre avenir réside peut-être dans ce contact intime
avec la nature. Quelques conseils pour les planétariums: 1) devenez votre propre
porte-parole; 2) répondez aux besoins de vos visiteurs; 3) développiez des
partenariats; 4) suivez les changements technologiques et 5) diversifiez vos pro-
duits. En d’autres mots, adaptez-vous continuellement, trouvez votre créneau.

La revue Planetarium présente des chroniques régulières dans chaque numéro
publié:

La revue de livres (April Whitt)
résumés et critiques de livres dont la thématique peut intéresser le per-
sonnel des planétariums

Le coin de l’ordinateur (Ken Wilson)
présentation de logiciels pouvant intéresser le personnel des planétari-
ums

Forum (Steve Tidey)
debat d’idées concernant un sujet d’intérêt pour les planétariums

«Gibbous Gazette» Les potins planétaires (Christine Shupla)
nouvelles diverses concernant le milieu des planétariums et ses gens

Nouvelles internationales (Lars Broman)
nouvelles en provenance de chacun des groupes régionaux associés à
l’IPS

«Jane’s Corner» Le coin de Jane (Jane G. Hastings)
commentaires de l’auteur

Nouvelles des planétariums portatifs (Susan Reynolds)
nouvelles des utilisateurs de planétariums portatifs du monde entier

Ouvrons le dôme (Jon U. Bell)
presentation d’observations du ciel étoilé en relation avec des spectacles
planétariums

Planetectnia (Richard McColman)
discussion détaillée de diverses pièces d’équipement utilisées dans les
planétariums

Mémoires d’un planétarium (Ken Perkins)
commentaires d’un vétérain du milieu des planétariums

Message du président (Dale W. Smith)
message du président de l’IPS

Quoi de neuf? (Jim Manning)
presentation de nouveaux produits susceptibles d’intéresser le personnel
planétariums

The PLANETARIAN est une revue trimestrielle, publiée par l’IPS et distribuée à
tous les membres de l’association.

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Griffith Observatory
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Los Angeles, California 90027 USA
jmosley@grifftihObs.org
More recently, Jordan has returned to graduate school at Indiana University and earlier this year he completed a doctoral dissertation on the history of the American planetarium community from 1930 to 1970. A copy of this insightful study arrived on my desk a few days ago for presentation to IPS. Before passing it on to IPS Historian John Hare, I hope to make time to read it. As we look forward to moving our profession into a new millennium, we would also do well to remember our roots and learn from the lessons taught by those whose work we build on. Jordan hopes to return to the planetarium community and plans to be with us at the Montréal conference.

At the spaceport

That SEPA conference in late June brought nearly 100 planetarians from the southeastern US together in Jacksonville, Florida at the Alexander Brest Planetarium. The busy schedule organized by host Patrick McQuillan included a wonderful day at the Kennedy Space Center where a succession of privileged behind-the-scenes tours showed us the working of America's spaceport. Like little ants, we stepped in the cavernous Vehicle Assembly Building and stood utterly dwarfed beside a Shuttle fuel tank. Later in the visitor center, the recumbent parts of a Saturn V had lost none of their power to impress, even though a generation had passed. While many of us remember the Apollo days first-hand, to almost all of our students and younger visitors, are days that come to take so much for granted, I hope that we can convey to our charges some sense of the awe that we do best in the planetarium community and to be with us at the Montréal conference.

IPS Slide Service

One of the things we do best in planetariums is to show these superb images to our classes and audiences, and one of IPS's emerging member services is to help you obtain these images.

We inaugurated the IPS slide service in 1995 and have recently reorganized it to provide direct distribution of these images by IPS. Beginning with the year 2000, slides from the Hubble Space Telescope and from the Jet Propulsion Lab will be distributed to subscribing planetarians in the US and Canada directly by IPS, replacing the existing service through the regional affiliates. Planetarians elsewhere in the world may also subscribe to the direct IPS service or may obtain the images through the regional affiliate serving their geographic area. For full details, see the president's message in the September Planetarian.

An order form to subscribe to the slide service appears as part of this message. Please note that we have extended the starting date from November 1998 to January 2000. Your order form must be received by January 15, 2000 if you wish to subscribe to first service period.

The actual distribution and handling of this direct IPS slide service is being sponsored by Bowen Productions. IPS is grateful to Jeff Bowen and his co-workers for their support of this important service.

IPS Video Service

The first IPS laserdisk is now ready! Its preparation spearheaded by Thomas Kraupe, the disk is filled with more than 30 superb video sequences released by ESA. The sequences include a variety of launches, timelapse scenes of terrestrial weather and solar flares, several Cassini-Huygens clips, animations of a dozen spacecraft (such as Meteosat, Soho, Ulysses, & Hipparcos), and much more. We are grateful to ESA for their wonderful cooperation.

Advance copies of the disk were premiered at the Desert Skies and GLPA conferences in October and you can preview samples on the IPS web site at www.ips-planetarium.org.

An order form for the laserdisk appears as part of this president's message and is also posted on the IPS web site. As promised in earlier announcements, this disk is being made available at cost and we have kept those costs under $100 per disk for IPS members. Thanks to Thomas Kraupe and Martin Ratcliffe for their work on this exciting project.

A second disk is in planning with equally stunning sequences from NASA/JPL. I'll keep you posted on its progress.

Does Mars beckon?

As I've described in the last two turns of this column, IPS is sponsoring a contest in connection with the widely publicized Mars Millennium Project. IPS will award cash prizes to its members whose teams design the Martian village which best incorporates the concept of a global community. Complete rules for the contest, which is being chaired by Jeanne Bishop, were published in the September president's message and are also available on the IPS web site. Entries are due by March 25 and the winners will be announced at the IPS 2000 conference in Montréal.

IPS 2000 in Montréal: July 9-13

Speaking of Montréal, I hope your millennium plans include being a part of the 15th biennial IPS conference as we assemble at the dawn of a new millennium. We'll be meeting in one of North America's most international cities and conference host Pierre Lacome <pierre_lacome@astro.umontreal.ca> and his team have prepared an exciting agenda filled with papers, workshops, panel discussions, invited talks, exhibits, demonstrations, and plenty of time for informal conversation as well. Most events are scheduled conveniently right in the conference hotel, and we'll also have two evenings in the planetarium a short walk away. The conference mailing contains all the details, and you can also find information on the conference web site at www.planetarium.montreal.qc.ca/IPS2000. The conference language is English. So plan now to attend and contribute an oral or poster paper and share your insights with the planetarium world. You'll return enriched and recharged and an even better planetarian than you were before.

Educational web sites

One of the exciting new features on the IPS web site is an annotated roster of educational web sites that Jon Elwert is developing. Check it out at www.ips-planetarium.org/ips-resources.html. It lists a growing number of sites with a brief description of each. Here's a sample:

Astronomical Society of the Pacific www.asp.org/subpages/education.html

The educational resources at this site include: "Universe at Your Fingertips," hands-on activities; a resource list for learning more about women in astronomy; "Universe in the Classroom," contents on teaching astronomy in grades 3-12; annotated list of web sites about teaching astronomy to non-science majors; information about Project ASTRO.
We have all discovered certain web sites which are especially useful in our educational efforts, and that's where you can help in this IPS project. It's easy:

Send Jon <jelvert@lane.k12.or.us> the name and web address of one or two of your favorite web sites for astronomy education. He will do all the rest.

If we all help out in this simple way, together we'll have a terrific set of links to the best of on-line astronomy education resources.

IPS Directory of the World’s Planetarians

On March 19th, 2000, the next issue of the Day of Planetaria, that has been organised since 1995, will take place. The annual Day of Planetaria always takes place the Sunday before or after the Spring Equinox. The aim of this initiative is that of promoting the knowledge and the diffusion of planetaria. Suggestions for the planetaria accepting the proposal of collaboration for the Day of Planetaria of March 19th, 2000:

1) During this “Day” the planetaria offer their ordinary program or organize special events freely, such as lessons, shows, exhibitions, practical sky viewing and so on. Obviously in the monthly, weekly or daily program we suggest to indicate that “March 19th, 2000” is the annual “Day of Planetaria” that is celebrated in different countries. Join in the celebration of the “Day” it does not take a big effort;

2) In the leaflet that describes your planetarium program or in a special leaflet printed for the “Day,” planetaria are invited to reproduce the logo of the “Day of Planetaria” (available in Internet at: http://www.cityline.it/cult/Grup_science/plan_ eta.html, or simply opening the science pages on Internet “http://www.cityline.it”).

3) If you decide to print a special leaflet for your public we suggest that you mention the total number of the planetaria operating in the whole world and in your country (see the IPS Directory), the existence of the International Planetarium Society and the name and reference of your Regional or National planetarium Association.

4) The entrance is free in some planetaria during the “Day”.

5) For such an occasion exchanges and twinships between planetaria of Eastern and Western, Northern and Southern countries are promoted.

6) We are inviting all the planetaria, not only the European ones, to take part and to support the “Day”, for example celebrating a planetarium recurrence (anniversaries of planetarium buildings or openings and so on).

7) The initiative provides a good chance of diffusing the knowledge of planetaria to the large public. The simultaneity in different cities draws mass media attention to this event. Obviously each planetarium is invited to indicate in the “press releases” that March 19th, 2000 is the “Day of Planetaria”.

8) The programs of the “Day” sent to Italian Planetaria’s Friends Association will be also available in the Internet site “www.cityline.it” (pages of “Science”). We suggest that you create a permanent space in your Web site devoted to the “Day”. For this reason we inform you that the proposed date for next “2001 Day” is March 18th. In this way we can create a permanent link between your site and “www.cityline.it”. Communicate to the webmaster of our Internet site your Web address. Programs could be also collected in each country by “Day of Planetaria” collaborators. In Slovakia, for example, the programs are collected by Patricia Lipovska (Sarisska Hvezdaren a Planetarium, Presov).

9) In the occasion of 2000 “Day of Planetaria” we also offer the idea of an astronomical children drawing exhibition on line in particular to other planetaria that collect children drawings. At the moment we’re collecting in Internet (www.cityline.it/cult/ZANI/desegni.htm) the best drawings about two national astronomical contests and about the teaching activities with the students. We suggest that planetaria send us a copy of one of their best drawings collected in the last year or to select the best drawings among the planetarium young visitors of the last few months. The best way is to publish these drawings in your Web site and to communicate to us your Internet address. This exhibition on line will became the “junior” section of “Day of Planetaria,” increased each year by new contributions.

10) A special post card has been prepared with the “Day” logo. The image is the best photo of a national contest devoted to the total solar eclipse of August 11th, 1999.

We hope that in the future also other countries join in this initiative. For further information or suggestions you can contact us at: Associazione Amici dei Planetari, c/o Centro Studi e Ricerche Serafino Zani, via Bosca 24, 25066 Lumezzane (Italy), fax 30/872545, email:info@serafinозани.it.

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IPSLIDE
Subscription Form — Period #1 (begins January 1, 2000)
[must be received by January 15 if you wish to subscribe for this period]

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Name
Institution
Address

City and postal code Country

Slide Subscription:
____ $39 IPS member price
   to be used if: you are a current individual member of IPS, or
   your facility is a current institutional member of IPS, or
   you are joining IPS using this form

____ $59 non-member price

New Member Dues:
____ $40 IPS membership dues (1 year individual membership) to be used only if you wish to become a new individual member of IPS

Total Amount Enclosed:

Method of payment: [fees must be in US dollars and paid by a check drawn on a US bank, by an international money order, or by credit card. If you must deposit funds by bank transfer, please contact Mr. Laatsch first and include an $18 bank service fee.]

Check # Other Visa/MC/AmEx # Exp. Date
Name __________________________ Signature __________________________
(required for credit card only; please print) (required for credit card only)

Membership address (if needed):
[if you wish to receive membership materials such as the quarterly journal Planetarian at a different address from the one listed above, please list this address here.]

Name
Institution
Address

City and postal code Country

Please send this form and fees to:
Shawn Laatsch, IPS Treasurer/Membership Chair
Arthur Storer Planetarium
600 Dares Beach Road
Prince Frederick MD 20678 USA
Phone 1-410-535-7339
Fax 1-410-535-7200
Email 102424.1032@compuserve.com
IPS VIDEO SERVICE ORDER FORM

**Laserdisk #1:**
*IPS/ESA Videocompilation Vol. 1: European Space Agency 1996-1999*

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**Laserdisk order (prices include shipping):**

- **$95** IPS member price
  - to be used if: you are a current individual member of IPS, or
    your facility is a current institutional member of IPS, or
    you are joining IPS using this form
- **$135** non-member price

**New Member Dues:**

- **$40** IPS membership dues (1 year individual membership) to be used only if you wish to become a new individual member of IPS

**Total Amount Enclosed:**

**Method of payment:** [fees must be in US dollars and paid by a check drawn on a US bank, by an international money order, or by credit card. If you must deposit funds by bank transfer, please contact Mr. Laatsch first and include an $18 bank service fee.]

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Vol. 28, No. 4, December 1999

*Planetarian* 59
Imagine: a Grand Piano in the Space Dome/Imax Theatre with stars, nebulas, rotating planets, supernovas, film and the music of Yul Anderson

**YUL ANDERSON**

**Concert**

*Torsdag d. 3. juli kl. 21*
*Lørdag d. 5. juli kl. 22*
*Torsdag d. 10. juli kl. 21*
*Lørdag d. 12. juli kl. 22*

**The ultimate piano experience**

*DryitNET: 30 88 70 22*
*Planetariet: 33 12 12 24*
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Se også Planetariernes hjemmeside:

http://www.astro.ku.dk/tycho.html

**NEW CD: “Dream sky”**

*We want to take you higher*

**Planetarium Concert Management**

A company dedicated to the Promotion of Concerts in Planetarians seeking to expand their Special Activities Program.

**Now on tour in Europe**

*“THE ULTIMATE PIANO EXPERIENCE”*

Direct Booking: P.C.M. Tel/Fax 0045 33 14 70 05

See Tycho Brahe Planetarium Web-Site:

http://www.astro.ku.dk/tycho.html

click on “Program” then “Særleg Activities”
It would be hard to imagine a planetarium who hasn’t gazed at the night sky (real or projector-produced) and found his or her thoughts wandering to such topics as “What is the meaning of life?”, “What’s it all about?”, or “What is this Universe, anyway?”

Famous people like astronomer Bart Bok are not immune to such awe-struck considerations. He was once interviewed about his life as an astronomer. The interviewer readied his pencil for quick note-taking, preparing for some scholarly answer to this question: “Why did you begin your study of the stars?” Dr. Bok’s answer: “Because they are pretty!”

‘Because they are pretty.’ I like that. Apparently lots of people have thoughts about the Universe. After the end of this sentence, you will find some of these thoughts from various individuals about the “Nature of the Universe”

- Douglas Adams: “There is a theory which states that if ever anybody discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened.”
- Albert Einstein: “Only two things are infinite, the universe and human stupidity, and I’m not sure about the former.”
- Unknown: “Astronomers say the universe is finite, which is a comforting thought for those people who can’t remember where they leave things.”
- Edward P. Tryon: “In answer to the question of why it happened, I offer the modest proposal that our Universe is simply one of those things which happen from time to time.”
- John Andrew Holmes: “It is well to remember that the entire universe, with one trifling exception, is composed of others.”
- Max Frisch: “Technology is a way of organizing the universe so that man doesn’t have to experience it.”
- Kilgore Trout (Kurt Vonnegut): “The universe is a big place, perhaps the biggest.”
- Woody Allen: “I’m astounded by people who want to ‘know’ the universe when it’s hard enough to find your way around Chinatown.”
- Douglas Adams #2: “In the beginning the Universe was created. This has made a lot of people very angry and been widely regarded as a bad move.”
- William J. Broad: “The crux ... is that the vast majority of the mass of the universe seems to be missing.”
- Rich Cook: “Programming today is a race between software engineers striving to build bigger and better idiot-proof projects, and the Universe trying to produce bigger and better idiots. So far, the Universe is winning.”
- Fred Hoyle: “There is a coherent plan in the universe, though I don’t know what it’s a plan for.”
- Ray Bradbury: “We are an impossibility in an impossible universe.”
- Christopher Morley: “My theology, briefly, is that the universe was dictated but not signed.”
- Edward Chilton: “I’m worried that the universe will soon need replacing. It’s not holding a charge.”
- Calvin and Hobbes (Bill Watterson): “The surest sign that intelligent life exists elsewhere in the universe is that it has never tried to contact us.”
- Carl Zwanzig: “Duct tape is like the Force. It has a light side, a dark side, and it holds the universe together ...”

Overheard at Southeastern Planetarium Association meeting in Jacksonville, Florida in June, 1999:

- Planetarians are obsessed: each one wants to be the first “kid in the dome” with the latest “toy” or procedure. This becomes evident at each year’s regional conference when individuals demonstrate or describe the wonderful new product or procedure he has acquired or created. In introducing his topic at the paper session, George Fleenor of Bradenton, Florida, said, “I’m the first person at a SEPA [Southeastern Planetarium Association] meeting to use a PowerPoint presentation. The next speaker, Kenneth Moore, of the Virginia Living Museum in Newport News, said, not to be outdone, “I’m the first person to use a remote mouse (for a computer) in a presentation.”
- Next up was Patrick McQuillian, of the host museum in Jacksonville. “How could I do one better?” he thought. He then said, as he looked at the traditional tray of slides he was preparing to show, “I’m, the first person at a SEPA conference to use a slide tray without a locking ring on top!”
- A tour of Cape Kennedy was one highlight of SEPA. A bus took us from Jacksonville to Cape Canaveral. Participants were driven around the grounds to each place we toured. We were given VIP tours of the VAB, the Space Station construction areas, etc; we got off the bus to get a close view of the shuttle on the launch pad that was to take up the Chandra satellite. We got back on the bus and went a couple of miles; it was 11:30 AM and we heard the tour bus leader say, “OK, let’s get off for lunch”. We prepared for eating bagged goodies out on the picnic tables we saw outside the bus. No lunch bags were visible. “What’s going on? Where’s lunch?” we said. The leader said, “Not lunch. Launch. Look over this way.” About two minutes after leaving the bus, we saw the launch of the Far Ultraviolet Spectroscopy Equipment (FUSE) spacecraft!

- At an elementary school served by the Savannah, Georgia, Board of Education, planetarian Max McElvey asked all the second graders to leave their shoes outside the Starlab. During the lesson, one of the students, Jason, was sent out of the Starlab for misbehaving in the dark. While side the Starlab, he tied together all the shoes of the kids who were inside the Starlab. When the class emerged, Max said “Now I wonder who tied all those shoeslaces together, JASON.” Jason could not figure out why Mr. McElvey knew it was he; after all, no one saw him do it!
- Edwin Faughn and Ray Foppiano report strange happenings at the planetarium of the Pink Palace Museum in Memphis, Tennessee. They were running a popular planetarium show, “Planet Patrol” (distributed by Sudekum Planetarium in Nashville Tennessee). Different staff members served as console operators during each showing. They began noticing the image of Sam Snork, a character in the show, looked slightly different each day. They figured out why when, over a period of days, Sam Snork’s image morphed into a look-alike of one of the planetarium console operators. The bored operator was entertaining himself by using the planetarium program Photoshot to gradually alter the character’s image so that it ended up looking like him!
- Mike Sandras, planetarian from Kenner, Louisiana, has a space station module at his facility. From questions from the public, he’s discovered that most people think the space station is already in space! Also, 90% of the questions he gets from the public are about the space toilet!
- Mike also won the “Best T-Shirt-Ap­Picked-by-Janet-Hastings” contest. His said: “I was abducted by aliens and all I got was this lousy T-shirt!”
- Jon Staib has been employed for a long time at the John Wells Planetarium at James Madison University in Harrisonburg, Vir-
Virginia. “Several times in the lifetime of a faculty tenure here”, he says, “a dean of the college will read a book over the summer about some sort of ‘innovation’ in education, and a new general education course will appear in the fall catalog. In the philosophy evoked by this ‘innovation’, Jon was directed to abandon the planetarium for teaching about the seasons and moon phases, and to use student observations instead. “The students selected whether to watch sunrises or sunsets; they chose sunsets. At least, they discovered that the sun doesn’t always set in the west and the moon’s phases are not caused by the earth’s shadow!”

- Allen Wells, the Spitz Systems representative, from Chadds Ford, Pennsylvania, gave a presentation in which he talked about the “AGVE”.

Someone from the audience asked, “What do the initials stand for?”

Allen answered “Advanced Group Visualization Environment”.

Then the voice said, “Well, what is that?”

Allen explained: “I mean the starfield, the dome, the cove lights, and theatre automation system of sound, pictures, etc”.

“Oh,” continued the voice from the audience, “you’re talking about a PLANETARIUM!”

- Paul Tetu, representative from Sky-Skan, Inc. from New Hampshire, gave a talk about their products and then said “we have a website: it’s for those of you who have impulse buys late at night; we’re there for you.” A ripple of laughter went through the audience, the idea of someone buying planetarium shows late at night. “Don’t laugh”, said Roger Joyner from Greensboro, North Carolina. He continued, “I woke up one night at 3:00 A.M. and a voice told me to buy a LochNess show, ‘The Cowboy Astronomer’, so I did.”

- Mark Petersen, of LochNess Productions, in Groton, Massachusetts, introduced a new show called “Star Quest” and said it would not be for the “faint of dome”. Interpretation: it will require a lot of projectors!

- Dave Hostetter, planterian from Lafayette, Louisiana, needed volunteers from the SEPA audience to hold up something he was illustrating. He said, “Now come on. I never have any trouble getting volunteers from my student audiences. None of the students have ever been in the workforce, so they will quickly volunteer.”

- Dave also called the Revell toy company and asked for decals for an old Apollo model he found. He said it was for a model he built 30 years ago and he wanted to use in a planetarium show honoring the 30th anniversary of the moon landing. “Wow!” said the Revell representative, on the phone. “That’s neat” They sent a set to him for free.

- Duke Johnson and Karen Osterer from SciWorks in Winston-Salem, North Carolina, showed an example of a business card someone might use for the Y2K doomsdayers. It read:

“Call info on Earth’s Destruction, Call 1-900-NO EARTH $1.00 1st minute $2.00 each additional minute No charge after destruction Credit cards cannot be processed in a timely manner”

- Van Abernathy from the Discovery Place, in Charlotte, North Carolina, said they got a complaint from a member of the audience while they were running “Light Years from Andromeda”. The complaint? “The narrator sounds too much like God.”

- Carole Helper, planetarian at the Museum of Arts and Sciences in Macon, Georgia, met a woman in Albany, Georgia, who is a fellow planetarian; the woman was new at the job and was very enthusiastic.

Carole said: “You don’t have any planetarium experience. How did you get the job?”

Lady: “They said I was just what they were looking for!”

A Farewell Message

As I hinted at IPS’98, my future at the London Planetarium was going to change. The situation has not improved and for this reason I have decided to take early retirement from the end of this year, and devote my energies to something else - possibly further studies, or some sort of charitable work - and I shall continue my involvement with Shakespeare’s Globe Theatre. I would like to take this opportunity of saying a really big “Thank You” again to all of those whom I have not already contacted, and who have helped me over the years with your time and advice. I, like many others, have gained so much from the warmth and generosity of the planetarium community, and it has been a pleasure and privilege to join your ranks. I shall miss you all enormously.

— Undine Concannon

Undine Concannon, M.B.E., at Buckingham Palace on July 20th.

The award (which means she is now a Member of the Order of the British Empire) was presented by the Queen for services to the London Planetarium.

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