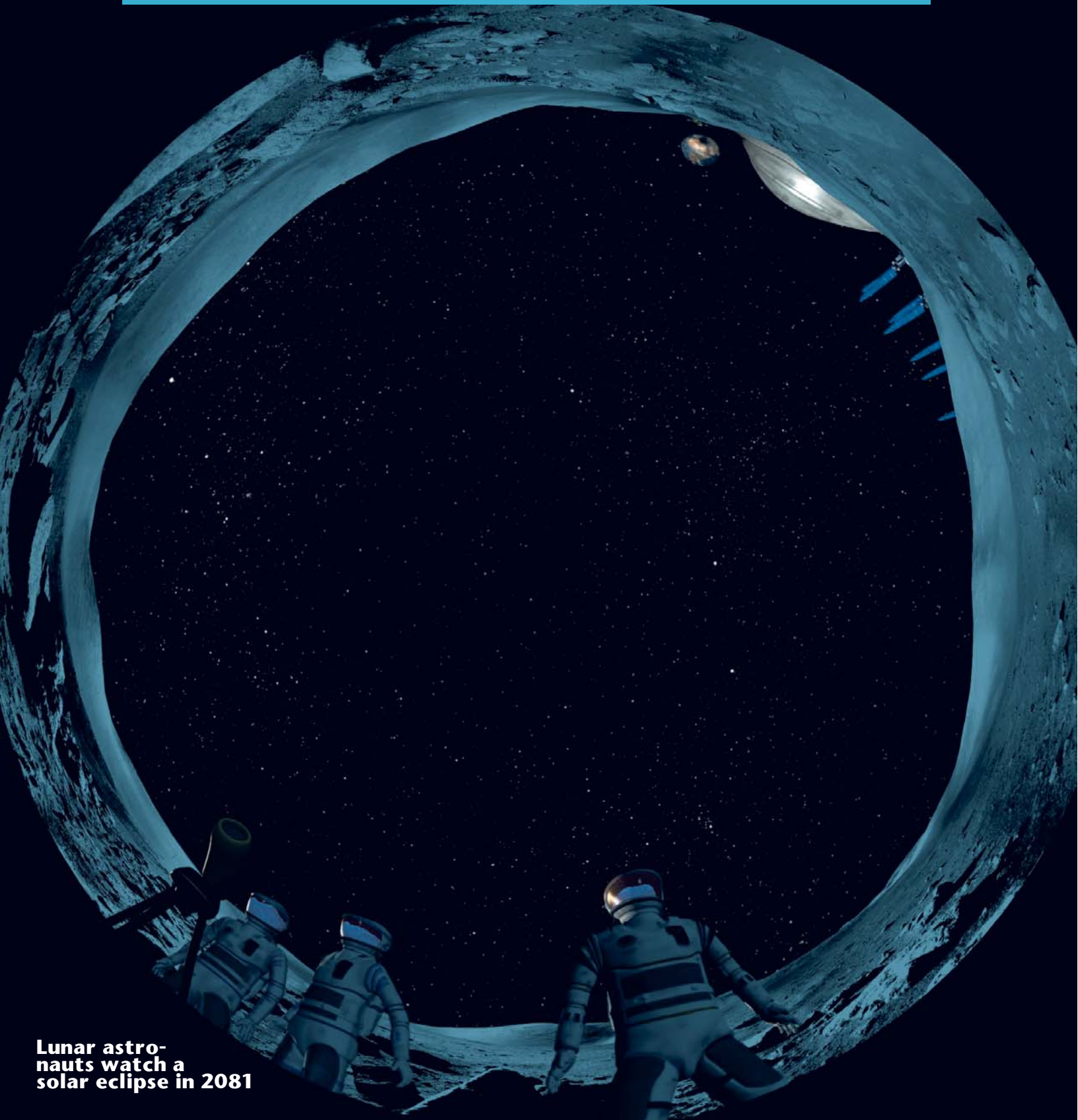


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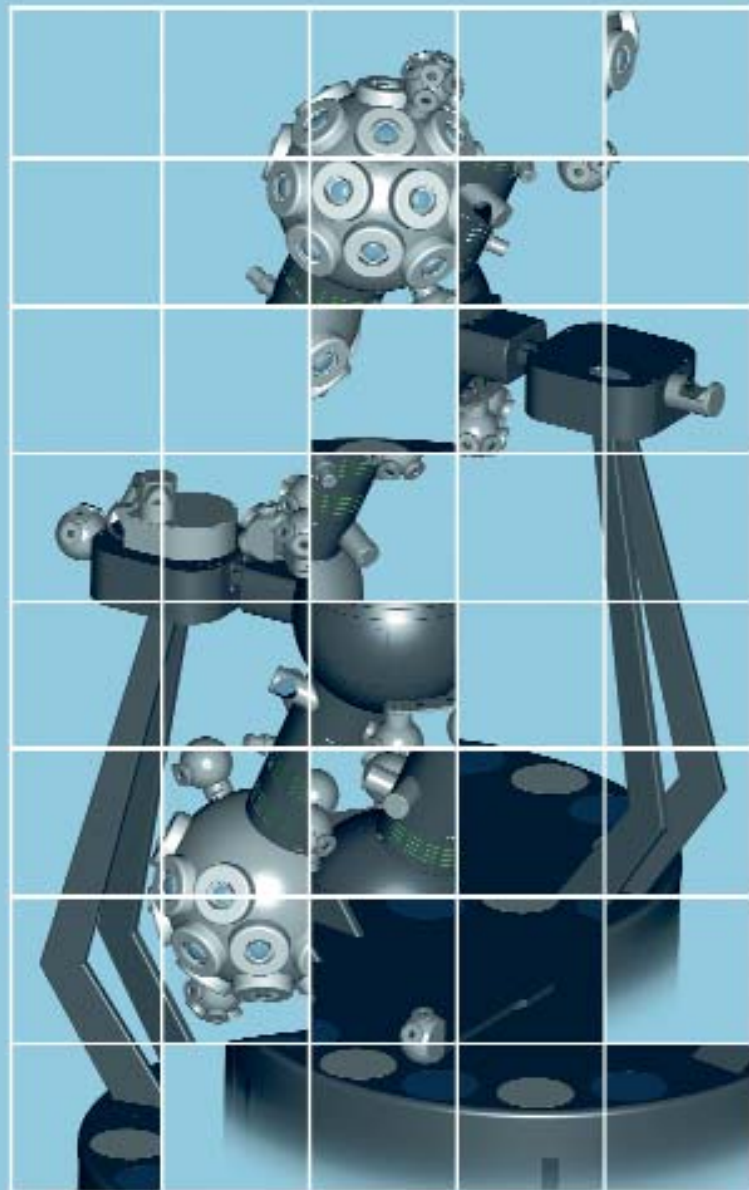
Journal of the International Planetarium Society



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Final Deadlines

March: January 21
June: April 21
September: July 21
December: October 21

International Planetarium Society home page:
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Planetarian journal *new* home page:
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Cover: Astronauts on the moon watch a solar eclipse in the year 2081. They gaze across the dome to the earth, which is near the opposite horizon. This full-dome image appears in *Earth's Wild Ride* by Home Run Pictures, produced by Houston Museum of Natural Science and Rice University. For more information visit www.e-planetarium.com. See page 61 in this issue.

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Editor's Keyboard



The summer 1980 issue of the *Planetarian* (see below) took me back - it contains the first article I published in this journal. It was a cooperative effort with Dr. Ernest Martin, and it presented his new work in redating the nativity of Jesus. For numerous historical reasons Dr. Martin concluded that King Herod died in 1 BC as opposed to the commonly accepted year 4 BC. The effect of this was to move the Jesus' birth to 3-2 BC (he later suggested the exact day in arguments I couldn't and still don't agree with), as opposed to 6-7 BC. This in turn called for a reinterpretation

of the Christmas Star, or the Star of Bethlehem, and that's where we planetarians come in. If Jesus was born in 3 or 2 BC, then our long-standing identification of the "star" seen by the magi as a triple conjunction of Jupiter and Saturn in 7 and 6 BC was wrong, and an explanation that dates back to Kepler himself needed to be revised.

The article came from a symposium on the date of the nativity held at Griffith Observatory in 1980 that convinced me that Dr. Martin was onto something. We revised our "Christmas Star" planetarium show, which we had presented essentially unchanged since the 1940s, to reflect the new, later date and the consequent identification of a series of Jupiter-Regulus and Jupiter-Venus conjunctions as the "star." That revised show was presented most Decembers through 2001 (a copy of the script appeared in the Vol. 13 #3 issue of the *Planetarian*). I wrote several more articles on the "star" for the *Planetarian* and a short souvenir book that is still available by mailorder from Griffith's bookshop.

Others contributed their thoughts on the matter to the *Planetarian*, and a spirited debate raged through these pages in the 1970s and '80s and made for lively reading. Several articles are on-line at the *Planetarian* website. Perhaps the parties exhausted themselves or

ran out of new things to say, and the debate subsided years ago.

I'm surprised that the debate over the date of Herod's death wasn't ended when historians of the period got together, considered it carefully, and resolved it one way or the other, especially with the 2000-year anniversary approaching through the 1990s. I quizzed Dr. Martin on this regularly. He explained that, unlike astronomy, where progress is so rapid it can be hard to keep up, historians work at a much more leisurely time scale. Perhaps so. Dr. Martin was convinced he was correct and eventually consensus would swing his way, and I still think that it will.

Dr. Martin died in January, 2002. Several new books have appeared on the subject in the last few years, but I'm not aware that they add much. The history still needs to be sorted out; the astronomy follows. On one hand, I'd like the issue to be resolved so I know one way or the other; on the other hand, it is nice for there to be unsolved mysteries to keep us intrigued and to remind us that science and history is a process of discovery, rather than a collection of facts.

At press time, Ed Lantz contributed the first installment of a new column: Digital Frontiers. Ed will bring us news of developments in the digital planetarium and "full-dome" video theater field. This is a welcome addition - and welcome, Ed!

Long-time readers of the *Planetarian* will recall a series of articles on the Star of Bethlehem that appeared in the 1980s and into the '90s. The first two of these appeared 25 years ago in the Summer 1980 issue, and they were "The Star of Bethlehem Reconsidered: A Theological Approach" by Carl Wenning of Illinois State University and "The Star of Bethlehem Reconsidered: An Historical Approach" by John Mosley and Ernest Martin in California. The first argued in three pages that the famous "star" seen by the magi at the time of the birth of Christ was the shekhina glory (the visible manifestation of God's presence) or midrash (a literary device), as opposed to an actual astronomical event. The second introduced Dr. Martin's historical research, just published in his new book *The Birth of Christ Recalculated!*, in which he concluded, for historical reasons, that Herod died in January, 1 BC, rather than the previously accepted 4 BC, and consequently that Jesus was born in 3/2 BC, and that the most likely explanation for the star was a series of conjunctions between Jupiter, Venus, and Regulus. His research caused the Griffith Observatory to revise its age-old *Christmas Star* planetarium show to incorporate his new ideas. And it sparked a debate that continues today.

25 Years Ago

James Brown's What's New filled almost one-half page (a far cry from Jim Manning's massive columns decades later), introducing products for pin-registering and storing 35mm slides.

The issue's longest article (at 10 pages, with 18 illustrations), by Dave DeVorkin and Michael Mendillo, was a retrospective on the canals and atmosphere of Mars as debated during the late 19th and early 20th centuries. Other than that the topic is often included in planetarium shows, the article had little to do with planetariums.

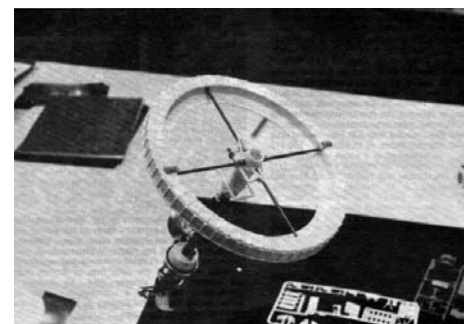
Jeanne Bishop's single-page Focus on Education alerted readers to a series of minor issues.

This was followed with Georgia Shurr's "The Heavens and a Conscious Mix of Immortality." In two pages this Professor of French at the University of Idaho critiqued a novel about Roman Emperor Hadrian's view of the sky. According to the novel, Hadrian was absolutely entranced by the sky.

In Herb Schwartz' Creative Corner, Brian Sullivan of the Flandrau Planetarium in Tucson, Arizona, described how to assemble a 3D model of a futuristic space station (which

resembled the von Braun-Bonestell space station of the 1950s) out of the lid of an ice cream container, a coat hanger, and other such odds and ends. It looks convincing to me. Two steps in the process are reproduced below. 3D modeling 25 years ago!

Jane's Corner rounded out a full 28-page issue.





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When The Life Science Centre received a grant from ReDiscover to upgrade The Big Brain Theatre, they needed a partner capable of providing a flexible solution, with the ability to show a variety of media and material.

Advised by their consultants, Visual Acuity, The Life Science Centre selected SEOS to provide a fully immersive, six channel, tilted dome, digital display. Opening later this year, the 10m (33 ft) interactive dome will enable them to show a large variety of material including their own 'Search for Life' interactive programme.

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SEOS has provided a flexible system capable of running not only a variety of interactive shows, but of hosting multimedia for conferences and meetings - being able to use the theatre for a variety of uses was essential for its longevity. Linda Conlon, Director, The Life Science Centre

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Screen Media Before Film and the Frontiers of Space

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Planetariums and museums often use interactive screen media as part of their exhibitions. The use of the latest screen technology to portray the stars has a long history, one which stretches back to the end of the eighteenth-century and the growth of optical recreations as part of a larger industry of popular entertainment and instruction. The nineteenth-century was obsessed with the disorientating thrill of new optical and screen media, ranging from panoramas and dioramas to stereoscopes and magic lanterns. There was a burgeoning industry of large format screen images that was ideally suited for portraying the solar system. From the microscope and magic lantern of the Renaissance, new optical devices have opened up previously unseen worlds. In keeping with this tradition, nineteenth-century public shows that opened up the sublimity of the stars and planets were part of a wider disorientating thrill of situating the viewer in different kinds of space.

The exhibition of large-format screen images can be separated into two distinct

I first became interested in the long history of screen entertainment when I was appointed as a research fellow and then lecturer at the University of Exeter, UK. Much of my work in Exeter is based at the Bill Douglas Centre for the History of Cinema and Popular Culture, a research centre-cum-museum, which opened in 1997, and which is devoted to the long history of the moving image. The collection contains around 50,000 artefacts, including many examples of panoramas, peep-shows, magic lanterns, and stereoscopes. One day, when I have finally finished playing with all of the optical toys, I hope to write a book on nineteenth-century optical recreations. -JP

but interrelated types. The first of these stems from the purpose-built institutions designed to house panoramas and dioramas. Robert Barker took out the first patent for a circular panorama in 1787, in which he envisaged the creation of a purpose-built

Planetariums and museums often use interactive screen media as part of their exhibitions. The use of the latest screen technology to portray the stars has a long history, one which stretches back to the end of the eighteenth-century and the growth of optical recreations as part of a larger industry of popular entertainment and instruction. ... nineteenth-century public shows that opened up the sublimity of the stars and planets were part of a wider disorientating thrill of situating the viewer in different kinds of space.

rotunda to accentuate the all-enveloping visual impact of a painted 360-degree scene. The first rotunda opened in Leicester Square in 1793 and another soon followed it in the Strand (fig. 1). A similar entertainment that relied on a purpose-built venue to present an illusionistic moving scene was the Diorama. The Diorama relied on a clever arrangement of shutters and blinds to alter the play of light falling onto a painted transparency. By changing the direction and amount of light the transparent image could be made to “move”, often transforming from a day to night scene. The Diorama first opened in Paris in July 1822, and was the brainchild of Louis Daguerre and Charles Bouton, two theatrical scene painters. Its success led to the opening of a building in Regent’s Park in 1823; temporary buildings soon followed in Manchester, Liverpool, Edinburgh, and Dublin.

Panoramas and dioramas housed in specific venues were notable for their visual spectacle and scale. The pictures displayed were enormous. The largest panorama circle at

Leicester Square was around 27 meters (90 feet) in diameter, while the diorama screen in Regent’s Park was 14 by 22 meters (45 by 72 feet). However, despite their novelty, the appeal of such large-format images was inherently limited. The large outlay of capital required for each picture and a building, along with the consequent inability to change the scene more than once or twice a year, meant that only London could support such purpose-built institutions.

Large-format screen media often prospered better as one element in venues that offered multiple attractions. The most significant example of this is the London Colosseum in Regent’s Park (fig. 3). It claimed to have been visited by more than one million people in the first fifteen years. Its main attraction was a

panorama of London viewed from an imaginary standpoint at the top of St Paul’s, and which measured 3,700 square meters (40,000 square feet). Additionally though, the Colosseum offered a Saloon decorated with sculpture and *objet d’art*, a cleverly constructed landscape garden in which had been cut ravines, mountains, and dells, and a conservatory 90 meters (300 feet) in length that was filled with exotic flowers and plants. The range of entertainment was completed by an imitation Swiss Cottage, which looked out onto a cleverly constructed mountain waterfall, and an enormous camera obscura on the roof. Other institutions similarly used individual optical media as only one element in larger exhibitions of technological curiosity and entertainment. The Regent Street Polytechnic, for example, which opened in 1838, had a typically eclectic program that included oxyhydrogen microscopes alongside phantasmagorias, dissolving views and elaborate lantern shows.

While the London Colosseum and Barker’s Panorama were fixed entertainments, most

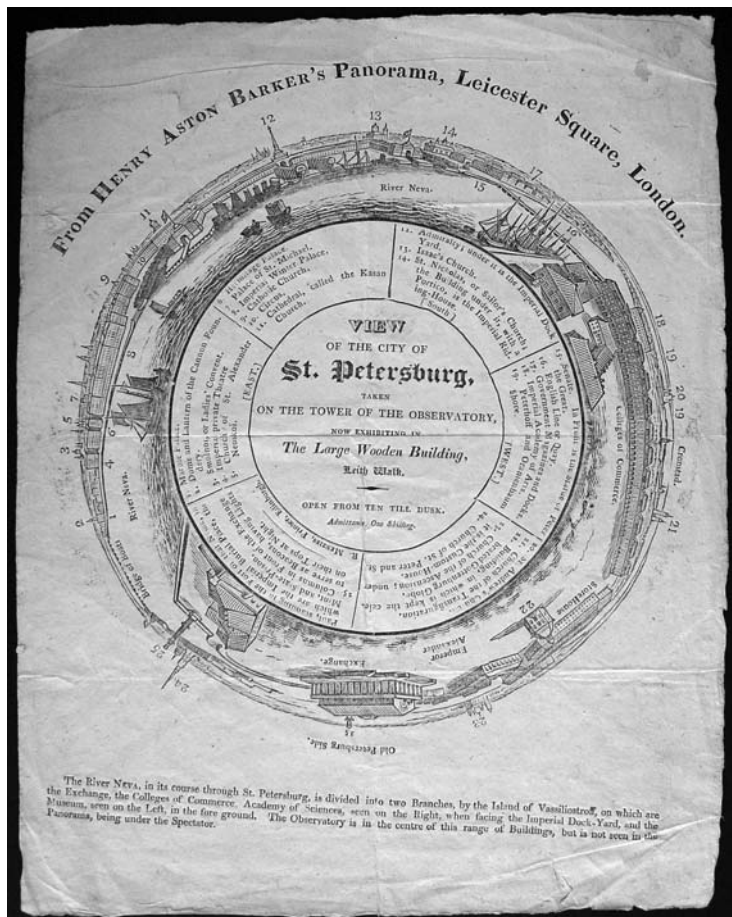


Fig 1. Henry Aston Barker's Panorama, Leicester Square, London, View of the city of St Petersburg, taken on the tower of the observatory (1819)

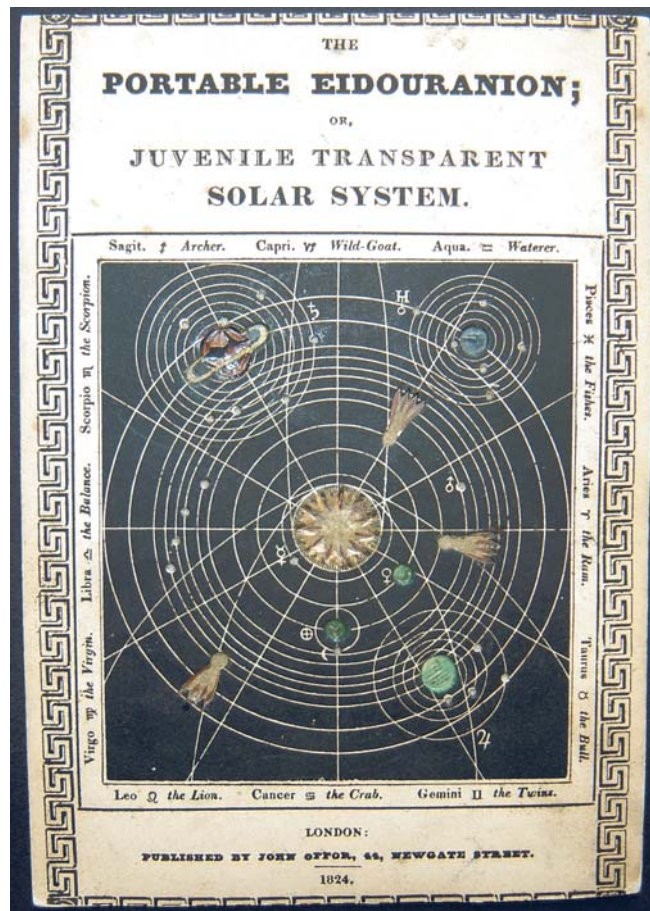


Fig. 2. The Portable Eidouranion; Or, Juvenile Transparent Solar System (London: John Offor, 1824)

panoramas, dioramas, and magic lantern shows toured a large number of venues in London and the provinces. Optical entertainments could be found in bazaars, pleasure gardens, theatres, scientific institutions, and mechanics institutes. Individual media adapted to this mode of exhibition that maximised the commercial success of any one show. Moving panoramas, for example, came to the fore from the early 1820s. Instead of being fixed circular scenes, they were enormous scrolling canvases that were mounted between two rollers, and which could consequently be transported to a number of venues. One of the most famous early shows was Marshall's Grand Moving Panorama of the coronation of George IV, which was accompanied by a band playing suitably patriotic music at the correct moment. By the 1840s, the majority of panorama shows were of this type.

Optical shows often played upon a mixture of technological realism and visual spectacle; they were predisposed towards subject matter that accentuated the impact of the screen experience. Exotic landscapes, vast cityscapes, and large events like the battles of Waterloo and Trafalgar formed the staple

matter of the panorama for example. It is thus unsurprising that astronomy and the mysteries of the heavens was a common subjects for optical shows that sought to provide a mixture of entertainment and instruction. As one London guidebook, *London Lions for Country Cousins and Friends about Town* declared in 1826, "Astronomy, universally acknowledged the most sublime and interesting of those sciences which admit of popular illustrations, is doubly valuable for its powerful influence and effect in the general improvement of the human mind" (Horace Wellbeloved, *London Lions for Country Cousins and Friends about Town* (London, 1826), 3). Astronomical lectures livened up with mechanical and optical devices benefited hugely from the drive for popular education in the early nineteenth-century.

The fashion for public shows using new optical media to demonstrate the working of the solar system was started by the success of Adam Walker's Eidouranion, or Grand Transparent Orrery. Walker's Eidouranion was a 6-meter (20-feet) high model orrery with transparent luminous globes to represent the planets (Richard Altick, *The Shows of London* (Cambridge, MA: Belknap Press,

1978), 81.). Unlike the small size of traditional orreries, the size of Walker's Eidouranion meant that it could be exhibited to large audiences in darkened auditoriums. Walker first exhibited his Eidouranion in 1781, playing for twenty-five nights at the Theatre Royal, Haymarket, and subsequently at the Lyceum Theatre in the Strand.

Walker's Eidouranion was for many years a fixture on the London exhibition circuit. After Adam Walker's death it was exhibited his son, Deane F. Walker, who was lecturing until at least the 1820s. *London Lions for Country Cousins and Friends about Town* declared of Walker's lecture that "its early days formed so novel, and, really, so interesting, so dignified an amusement, that we cannot hesitate to place it amongst the most respectable efforts to extend the beneficial uses of the stage" (Wellbeloved, 2.). An illustration of Walker's lecture suggests that way that the Eidouranion employed features used in large-scale transparencies to create its luminous effects (fig. 6).

The success of Walker's Eidouranion led to many similar shows and devices. In London, R.E. Lloyd's Diastrodoxon, another large Grand Transparent Vertical Orrery, provided

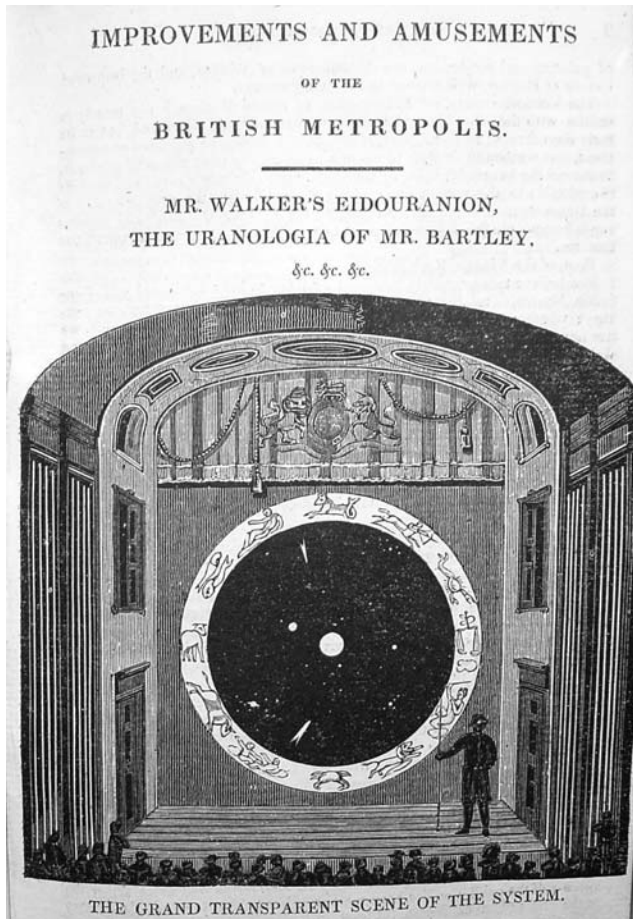


Fig. 6. "Mr. Walker's Eidouranion", from *London Lions for Country Cousins and Friends about Town* (London, 1826)

audience. The show is a microcosm of the cross-over between those shows devoted to unseen worlds of science and those which provided a glimpse of unseen landscapes or cityscapes.

The effects of large-format optical media were often reproduced by small-scale artefacts and prints that were designed for domestic consumption. Hand-held panoramas, small dioramic prints, and magic lanterns for the home were widely available. An offshoot of the success of public lectures on astronomy was a series of small-scale domestic devices. *The Portable Eidouranion; Or, Juvenile Transparent Solar System* was an educational children's toy produced in 1824 that exploited the success of large-scale transparent orreries (fig. 1). The astro-nomic chart was backed with coloured transparent paper and the shapes of several planets and comets were cut out from

the Eidouranion had a rudimentary translucent effect akin to its larger counterpart. Another transparent orrery produced for the home was by Elton of London in 1817, and was dedicated to Deane F. Walker. Elton's transparent orrery consisted of a moving panorama set in a wooden frame like a miniature theatre. The rolling scene was pierced with illustrations of star constellations and planets and backed with transparent coloured tissue. A window or a lamp could thus illuminate the scene from behind. The device borrows from the fashion for both transparencies and moving panoramas. Through scrolling the scene along, the user could be educated in the arrangement of the planets.

The success of nineteenth-century optical recreations helped to determine the range of attractions subsequently offered by the cinema and more recent multimedia technologies. The visual spectacle of purpose-built panoramas and dioramas is part of a tradition that stretches forward to Cinemascope and IMAX. Moreover, contemporary multimedia continue to be used to provide the same mixture of public entertainment and instruction as their nineteenth-century precursors.

Note: The images in this article are reproduced Courtesy of the Bill Douglas Centre for the History of Cinema and Popular Culture, University of Exeter, UK. Its web catalogue, including many digitised images of artefacts from the collection, is available at <http://billdouglas.ex.ac.uk/eve>.

beyond the ordinary perceptual limits of its the card so that, when held up to the light,

Web site/booklet respond to claims that the universe is young

The American Astronomical Society (AAS) has published "An Ancient Universe," an illustrated guide explaining how astronomers know that the cosmos is old and that it changes with time.

In several U.S. states there have been demands that discussions of the Big Bang and the vast age of the universe be excluded from science curricula in K-12 classrooms. In response, the Astronomy Education Board of the AAS put together an article first published in a newsletter for teachers on the Astronomical Society of the Pacific web site.

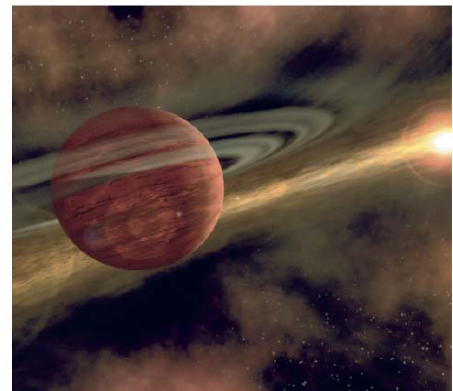
This article has now been expanded and updated into a booklet designed for school boards, principals, parents, and anyone who wants to see the scientific perspective on the age of the Earth and the physical world.

The 20-page non-technical booklet is available for free downloading on the web site:

<http://education.aas.org/publications/ancientuniverse.html>

The authors explain the evidence showing that we live in a universe that is between 10 billion and 15 billion years old and that both the universe and its contents undergo evolutionary change. A list of written and web resources is also included.

An Ancient Universe How Astronomers Know the Vast Scale of Cosmic Time



A Guide for Teachers, Students, and the Public
Published by the American Astronomical Society
with the Astronomical Society of the Pacific

Producing a Nationwide Planetarium Show

Pierre Chastenay¹, Alan Dyer², Erik Koelemeyer³, Scott Young⁴

The Quest for Origins

The adventure began in the spring of 2002. CASCA (the Canadian Astronomical Society) had just published its long-term plan for the future of astronomy in Canada, titled *The Origins of Structures in the Universe* (you can download this plan in PDF format at <http://www.casca.ca/lrp>). In this document, professional astronomers in Canada outlined the themes and research topics they intended to focus on over the coming decade and drew up a list of new telescopes they would need to achieve their scientific goals.

The key word from this vision of astronomy in Canada was “origins” – the origin of stars, planets, galaxies, and the universe as a whole. To us at the Montreal Planetarium, “origins” seemed an ideal theme for a planetarium show, especially since such a theme would help us showcase the work of Canadian astronomers and explain to the general public how research funds are used.

The pan-Canadian aspect of our endeavour also seemed a good way to put into practice a production approach that several French planetariums had experimented with recently, namely sharing production duties among several institutions. From the start, the plan was that each of our country’s major planetariums would produce key elements of the show best suited to their staff talents, rather than have one facility create a complete product then distribute it. We also knew that the Museums Assistance Program overseen by Canadian Heritage, a department of our federal government, would look favourably upon a grant application for a show on astronomy in Canada that would be presented at facilities right across Canada. So we embarked on our project, *The Quest for Origins*.

The Quest for Funds

With these notions in mind and a one-page project outline, the Montreal Planetarium contacted its colleagues from western Canada: Scott Young (Manitoba Planetarium), Alan Dyer (Calgary Science Centre), Max Scharfenberger (Edmonton’s Odyssey

um), and Erik Koelemeyer (H.R. MacMillan Space Centre in Vancouver). (The McLaughlin Planetarium in Toronto had closed its doors in 1995.) The idea appealed to everyone, provided of course that Canadian Heritage funded the project.

Not surprisingly, there was some skepticism about the feasibility of sharing the production of a 35-minute show among five

Producing a full-scale planetarium show at one facility is challenge enough. Doing it amongst four planetariums spread across one of the largest countries on the planet was even more fun! But in 2004 four major theatres in Canada jointly produced a planetarium show with a \$200,000 budget and opened it simultaneously across the nation.

institutions whose production and screening capabilities weren’t all compatible. Still, we were all willing to embark on the adventure. We expected the learning curve to be rather steep, but we recognized the real potential of creating a much larger scale show with five participants rather than one.

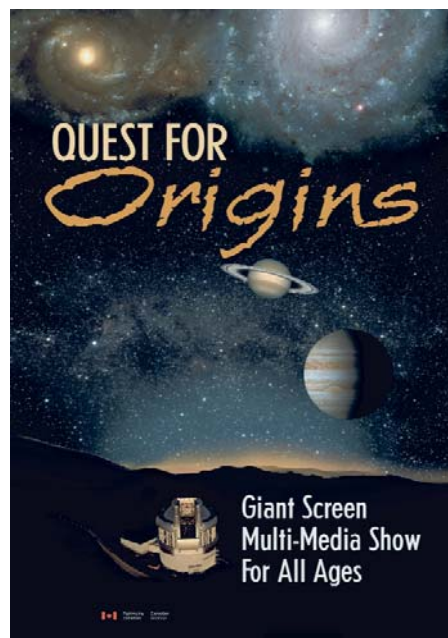
Montreal staff took on the task of preparing the official proposal for Canadian Heritage (since the original idea was Montreal’s), including a project description (written in collaboration with Calgary), a detailed budget, and a precise timetable. As English wasn’t the first language of most Montreal staff, and the other producers across Canada didn’t read French, the proposal was first done in French, then translated into English and submitted to others across Canada for revisions. We modified the original French version to reflect these additions and submitted the proposal to Canadian Heritage a few days before the deadline of November 1, 2002. Our next step was to wait.

We’d been told that the deliberation period could be long. Six months later, on May 8, 2003, a letter from the Honourable Sheila Copps, then the Heritage Minister, informed us that our project had been approved for funding to the level of \$82,920 (Canadian), only \$9,000 less than the amount we’d requested. This funding difference wasn’t large enough to derail the project. Indeed, it was easy to amend our budget to reflect the reduced funding, especially since all partners had agreed to provide the equivalent of \$20,000 each in services of all kinds (staff time and equipment).

However, by this time we were down to four partners, with Edmonton having pulled out, feeling that the final show, relying heavily on video, would not be presentable in their planetarium still populated only with slide and special effect projectors. Despite that, we now had the resources to begin production of *The Quest for Origins*, with the ambitious goal of opening the show one year later in May 2004 in four theatres on the same weekend.

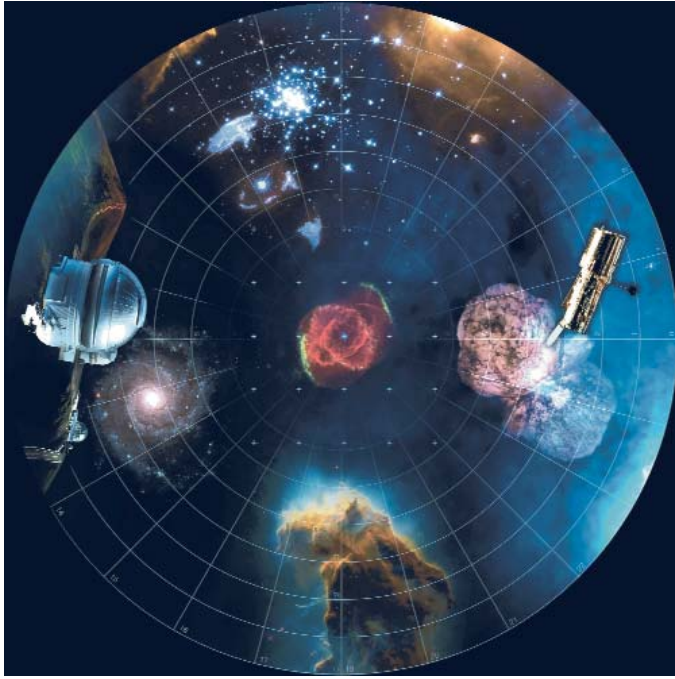
Standardizing Techniques and Formats

All our theatres had produced shows before that had been staged elsewhere in Canada. For example, Montreal had just produced the nationally-distributed *Climate*



The Montreal Planetarium created the base art for the poster for *The Quest for Origins*, a 35-minute planetarium show co-produced by a consortium of Canadian planetariums in 2004.

- 1 Montreal Planetarium (contact: chastenay@astro.umontreal.ca)
- 2 Calgary Science Centre (contact: alan.dyer@calgaryscience.ca)
- 3 H.R. MacMillan Space Centre (contact: ekoeleme@hrmacmillanspacecentre.com)
- 4 Manitoba Planetarium (contact: scyong@manitobamuseum.ca)



Montreal staff also created original show artwork such as this all-sky collage of imagery used to open the program, and onto which were projected smaller screens of changing slides and edited video clips. By distributing such all-sky images as layered Photoshop files, local planetariums could adapt the base art to suit their projector configuration and screen sizes, then output the digital files to film through a film recorder. Of course, with digital projection that last step will become an outmoded method of the past.

Change under a federal grant, and Calgary had produced several live actor shows that other theatres had staged. And Vancouver had promoted the idea of co-producing planetarium shows for a number of years. The motivation was the promise of an improved product through the combined efforts of a number of production teams, with each exercising their own specialty. In practice however some early attempts faced a number of problems which eroded some of the hoped-for advantages. These difficulties originated with the varying theatre configurations and dome sizes, and to some extent production philosophies. Learning from



The Manitoba Planetarium shot scenes on location using digital SLR cameras and wide-angle lenses, stitching them together to create a full 360° spherical scene from zenith to nadir. This could then be converted into a cylindrical projection [left] (for virtual reality pans for promotional purposes and websites) or to a hemispherical scene [right] for use as an all-sky in the theatre, in either a horizontal or tilt dome, with either multiple 35mm projectors or, in Calgary's case, with a single ProDome 2PI large-format projector.

these past attempts allowed us to develop a new model of co-operation, which worked quite well, much to our surprise.

One reason for the success we can attribute to the technological advances in show production over the past decade. Instead of having to produce a unique set of panoramas and all-skies for each facility, we were able to create "dome masters" in much the same fashion as digital theatres do, only we were dealing with just still images. The Manitoba Planetarium was the master of this technique, taking scenes shot on location and from other stock sources and stitching and distorting them through software such as PanoTools to master that could be further manipulated to suit a horizontal or

create a single dome further manipulated to suit a horizontal or tilt dome. Each planetarium could then process these using products like DigiDome to chop the master back into individual 35mm slides sized to work in each theatre.

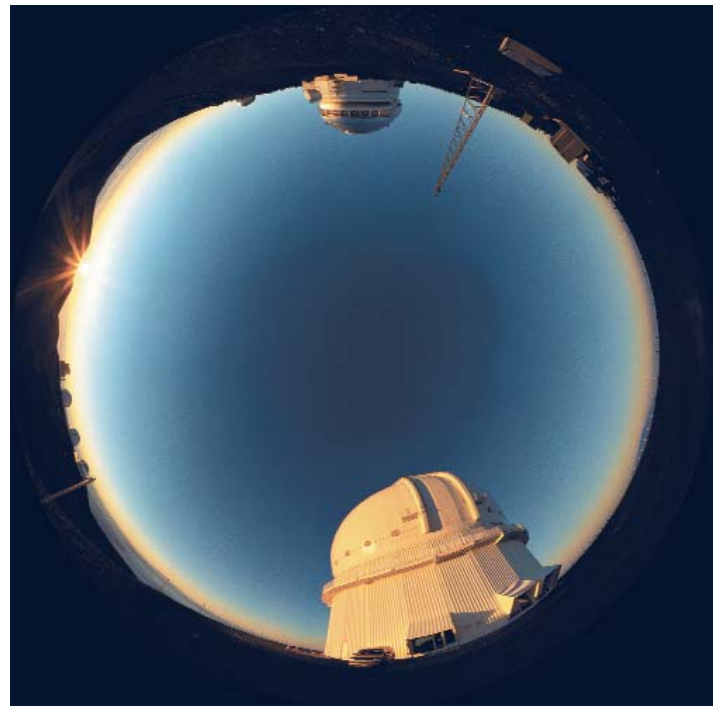
We also passed around raw video and animation se-

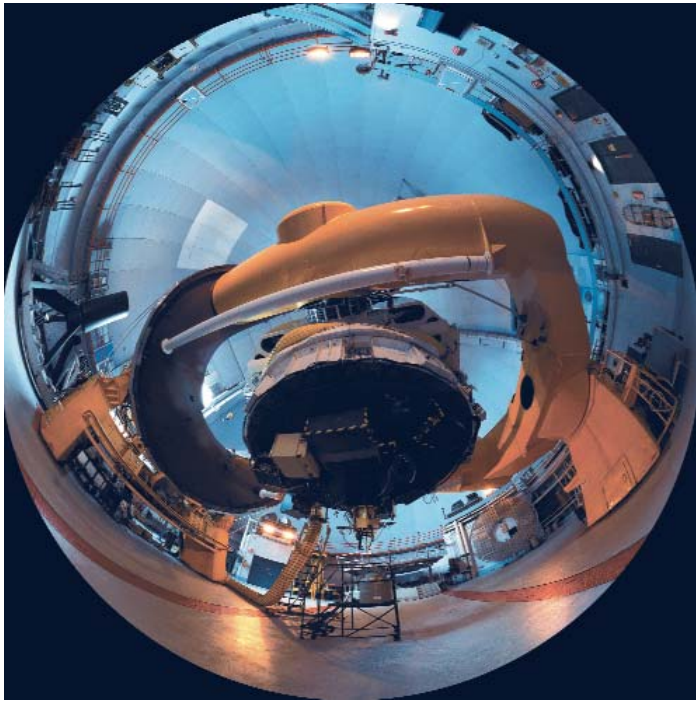
quences as standard QuickTime files on DVDs (it took a few attempts to settle on the right format) for further editing. We then distributed the final show's video content, both as an edited tape synced to the soundtrack and as raw clips for local conversion into multi-screen formats. (Our theatres have anything from one to four video screens, in varying sizes and aimed in various directions, but we all have some form of audio and video editing capability.)

Assigning the Tasks

Early in the process, we settled on who would do what based on our strengths. As the script and visuals list became finalized, each visual element was assigned to a specific facility so there would be no confusion as to who was responsible for each element.

Vancouver did much of the 3D video animation, using Lightwave software, with Calgary supplying some additional clips out of 3D Studio Max and After Effects. Manitoba took care of all still visuals, including panoramas and individual 35mm slides, and shooting location pans with digital cameras. Montreal created new digital artwork as well as supplied art panoramas from their stock library. Montreal also took care of all the intricate work in providing a French version of the show narration that exactly synced with the English soundtrack, no small task. (We narrated the show in English first, then had it translated into and narrated in French.)





Focusing on Canadian research, the Origins show visited observatories in which Canada has a share in the operations, such as the Canada-France-Hawaii Telescope (shown here), Gemini North and South, and the coming ALMA sub-millimeter array in Chile. The show's goals were to not only outline research findings but also to give the audience some idea of the people, techniques, and instruments involved in the research.

The show featured four Canadian astronomers who appear on video to introduce each of the show's four main parts and to give a "face" to Canadian astronomy. They were selected for their on-camera presence, while also representing various regions across Canada and quite literally the spectrum of wavelength regimes (radio, infrared, microwave and optical) discussed in the show. We

QuickTime of the video and soundtrack resulted in a set of code that was virtually plug-and-play, despite all programming being handled offsite.

For the soundtrack we hired Donovan Reimer, an experienced musician and soundtrack artist from Edmonton, who created all the original music and sound effects, then assembled the final soundtrack, in both

videotaped them in studios in Vancouver and Montreal. Two were able to narrate in both English and French, while for the other two we overdubbed a translation.

Select animations of solar system and galaxy formation were contracted out to well-known space artist and digital animator Don Davis who did a great job for us. For Calgary's facility, with its Digistar II, Aaron McEuen and his staff at Starlight Productions was hired to create all the Digistar graphics in superb fashion. Providing Starlight with detailed instructions and timing for each scene as well as a

English and French, in sync with video edited and supplied by Calgary. Being able to e-mail MP3 audio and MP4 video clips back and forth made life a lot easier.

One of the most important decisions we made was the selection of an all-powerful (!) director, someone who had the final say in all production issues. The director would be present for all important production events, like the live video shoots, and would work directly with the musician on the creation and mixing of the soundtrack. Calgary's Alan Dyer served as the show's central director, visualizing and editing the show, supervising staff from across Canada, and managing the production schedule and delivery of show elements.

The script, however, was written by one of Canada's best known astronomy writers, Ken Hewitt-White. Finding an author like Ken, who knows the subject and the scientists involved and who has extensive experience writing for TV and the planetarium medium, was essential to the success of the program. In any show, the script is everything.

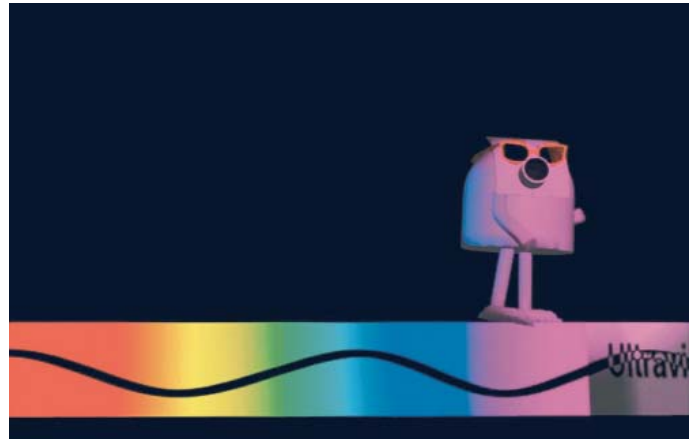
While cross-Canada conference calls took care of some issues, an important part of the budget and production process was getting key staff from every theatre together for face-to-face production meetings, usually with the writer present. These meetings, held centrally in Winnipeg at key milestones in the schedule, kept the show on track and everyone informed, permitting the timely arrival of production elements in our "just-in-time" process.

The End Product

The end result was a show with much higher production values than any one of our facilities could have created alone, to the



At each observatory site, a videotaped astronomer appears superimposed onto the scene, scaled and placed as realistically as possible, to introduce the next segment of the show. They were shot in studios in Vancouver (as with Doug Johnstone at left) and in Montreal (Rene Doyon at right). Other "star" astronomer hosts were Rene Plume and Christine Wilson



The show's other "star" was an animated character, Ollie the Observatory [left], created by Erik Koelemeyer in Vancouver and added for humor and kid appeal. The script subjected Ollie to various contortions as he demonstrated basic science concepts such as the EM spectrum [right], the Doppler shift, and the speed of light.

benefit of all our audiences, serving as a model for future immersive video productions. It opened on time and on budget, across Canada on the same date, and during its prime summer run played to 50,000 people. That was the obvious goal. But perhaps more importantly, we all benefited from the production expertise of other centers. Each of our production team members became schooled in the techniques of our colleagues. Even more critically, we learned to trust each other's abilities, and that's a critical step

to further partnership successes.

Lessons learned: the director needs to spend time at each facility, talking to and instructing all production staff directly, rather than just communicate through a local producer who might normally direct that staff but who, in this case, does not have the final "vision" of the show that the main director has. Extensive storyboarding is great but nothing replaces face-to-face discussions. We also need to devote more money and effort to developing marketing materials for effective

national and local advertising campaigns. And while some panoramas acquired from other sources served the purpose, the best-looking scenes were the ones we shot on location in a format to suit our unique medium.

Building on the success of this initial effort with *The Quest for Origins*, our group is looking forward to producing another show. Applications are in place to fund a major program about extra-terrestrial life. Stay tuned for more to come from Canada. ☆

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Star Magic: *Per Ardua Ad Astra Recreata**

Tom Callen
Astronomer/Program Producer
Cosmonova
Swedish Museum of Natural History
P.O. Box 50007
Stockholm, Sweden

It's after three o'clock in the morning, and I'm realizing that the caffeine in a can of soda doesn't have enough zip to keep my eyes open. Before me is the bright green display of a computer screen, its blinking cursor subtly hypnotic. Somewhere out in the pitch black on the other side of the control console where I'm sitting are my boss and one of our contractors for the presentation we're working on. Even though the console's number displays and illuminated push buttons are turned down really low, my eyes are so dark adapted that they are dazzled by what looks like the multi-colored readouts on the bridge of the starship "Enterprise."

If the lights were turned up on this scene, an outsider would instantly know they weren't in an ordinary room. But, which of its unique qualities would impress them the most? This room has round walls and a hemispherical dome for a ceiling that's 70-feet (21.3-meters) across. The giveaway that we're in a planetarium is the giant, bug-like star projector in the center of the room. Made up of thousands of parts - gears, lenses, light bulbs, motors, star plates and more nuts and screws than you'd want to count - it looks more like a giant toy rattle than a complex instrument capable of duplicating the night sky with stunning realism. You won't find any clearer skies in our air- and vapor lamp-polluted cities short of leaving urban lights far behind for a mountaintop in the southwest, or a boat out on the ocean.

Jim Sharp, Chief of NASM's Albert Einstein Planetarium, calls out from the darkness, "Could we make that fade up on the two galaxies about a second earlier, but change the rate so it takes a few seconds longer?" Steve Savage, our special effects contractor, agrees.

Reaching over I punch the rewind button on the 8-track tape recorder that has the

Author's note: during this past Christmas vacation I was cleaning through a box of things from my days in Washington, D.C., and I came across this article that I had written about 20 years ago but never had published. Reading through it made me think how far we had come in planetarium technology since that time, especially with the advent of all-dome video. When this article was originally written, video projection had come about in planetaria, but even we at the Albert Einstein Planetarium at the Smithsonian's National Air and Space Museum didn't have access to it. That finally happened around 1991, just as I was leaving for Stockholm. This article shows how far we've come in the elapsed time and provides some background to those in the planetarium field who have entered through the digital portal. Sure - having a render cycle not finish can make for a bad day, but it certainly doesn't beat a one-of-a-kind projector sitting in the projection gallery going up in smoke.

"State of the Universe" music and narration. It also contains the time code that triggers my computer to send its cues to the star projector and the hundreds of special effects devices shoehorned into the projection galleries. Stepping through the cues on the computer, I change the two bum programming lines. By now the tape recorder has rewound to the right place and stopped. Pressing the play button the chamber fills with composer Cary Ratcliff's lush synthesized score. The galaxies come up on cue exactly as requested. Narrator Pernell Roberts, personable star of television's "Bonanza" (if you're old enough to remember the western series) and "Trapper John, M.D." (if you're not), tells us that collisions can take place between galaxies, their stars passing by each other like ghosts. "That's fine," yells Jim over the soundtrack. "Can we back up one more time and see this entire section from the start to check the transition from the previous scene?"

Stopping the tape recorder before rewinding catches Pernell midword. Normally you wouldn't find this funny. Played loudly through a two thousand watt sound system in the wee hours of the morning, it suddenly becomes very funny. Between us we have nearly 70 years experience in the planetarium field; when you're really tired it all goes out the window. We're laughing like a bunch of kids who've just heard the latest teacher joke out on the playground. "Break time!"

Trudging down to the staff vending machines in NASM's basement we pass a security guard making his rounds. By now they are used to us shuttling around the building at all sorts of odd hours. "How's it going tonight?" he calls out. "Slowly, but surely." "Think you'll have another hit on your hands?" Good question. The gut reaction would be "yes," though at this critical point in a show's production there's always nagging doubts. Translating what we've seen in our collec-

tive mind's eye into a sight and sound extravaganza is a laborious process fraught with all sorts of pitfalls on paths the public never treads. At the same time, however, there is a sustained high that comes from trying to creatively depict complex astronomical concepts on the planetarium dome.

Contrary to what many people think, a planetarium show is not a giant movie, but hundreds of individual special effects devices whose images are created live show after show, day after day. Some of these "cut-rate cosmos creations" have unusual stories of their own. At times even what should be simple visual effects turn into major productions of their own.

We once needed a fire blazing in front of a Greek temple for "Comet Quest," our Comet Halley presentation. An ancient temple and twilight sky were easy enough to do with slides, but the fire was where we needed a different approach.

The simplest way to reproduce a fire is to

* Through Rugged Ways to Recreate the Stars

project a still image of flames through a rotating piece of clear plastic, though not just any plastic will do. To give the flames motion, plastic glass like the kind found in home shower stalls can be used. While it has the right texture to produce turbulent flames, a fire would soon repeat its motion every time the wheel turned once. While this is a tried and true method, we could do better.

Why not make a short movie of an actual fire to be projected with the Greek building and sky? Made into a continuous loop, the finished movie would never need rewinding, an important consideration since the Albert Einstein Planetarium gives as many as ten shows a day in the winter and thirteen in the summer.

It's anyone's guess what the neighbors thought the night we set up in my backyard to film our barbecue grill in action. Living out in Virginia twenty miles [30 km] from Washington, D.C. made this the ideal location as there would be few outdoor lights to effect our movie making. A large black tarp draped over the side yard fence provided a dark background. Even the grill's light-colored wooden handles had to be removed, or else the audience would have seen the filmed fire sitting in front of the temple with mysterious handles on either side of it.

While Jim and I prepared the pyre, production coordinator, Geoff Chester, set up the super-8mm movie camera about 15-feet [4 meters] from the grill. Liberally dosed with starter fluid, the blazing briquettes would've made a Valhalla-bound Viking proud. Problem was we made the fire too well; it was leaping higher than the camera's lens could cover. After waiting a few minutes filming could begin, but - for continuity - we could only run the camera until the flames were about to disappear below the rim of the grill. With the fire re-stoked and re-soaked, the procedure was repeated until we had several useable movie film rolls exposed. The high point of the evening was when a bit too much starter fluid was squirted on the glowing embers and SSSS ... KA-WHOMP!, a ball of flames the size of a small foreign car rolled up the back of my two story house. It certainly would have lent new meaning to giving one's all for the cause if anything besides the briquettes had caught fire.

Altogether the finished fire film was visible in the ancient Greece scene of "Comet Quest" for about 35 seconds, yet it took a day to organize, an evening to film, plus the development time at the lab prior to the continuous film loops being made up. Our visitors saw a realistic fire effect that illuminated the front of a temple. We also go to similar lengths to produce lifelike experiences right before the audience.

One of the most enjoyable times I ever

had as a graduate student was belonging to the in-house light show at Michigan State's Abrams Planetarium. These artistic performances of slides, lasers and dome-covering special effects were set to music ranging from classical to electronic to good old rock and roll.

One feeling we hope to convey is a sense of wonder about the universe that surrounds us. Sometimes just seeing the planetarium's starfield is enough. Other times acquiring a sense of wonder may take something more.

Besides performing weekly light shows on Friday and Saturday evenings, "Cosmic Radiance" also gave a special theme presentation from late October through Thanksgiving with a live jazz/rock band. They composed an hour of original songs, which we matched with equally original visuals. One year the theme was the circus while in another it was traveling around the world in a whirlwind tour of sight and sound.

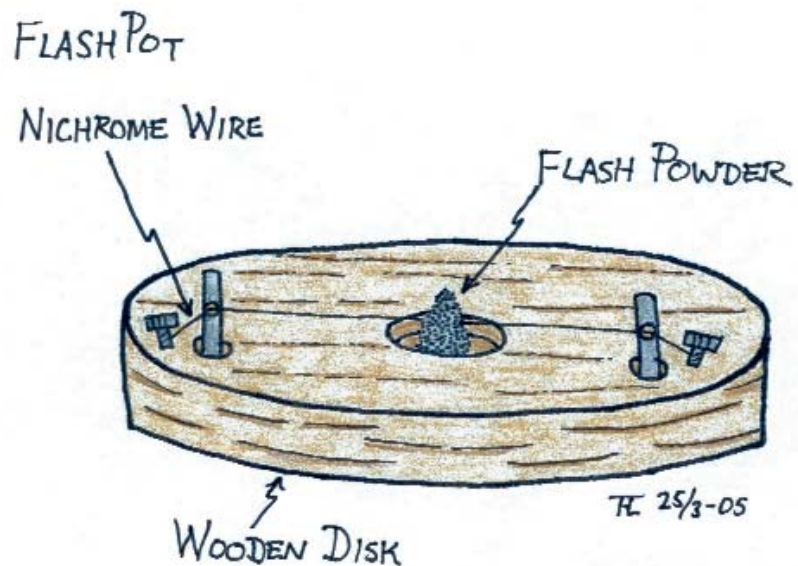
The last song, the prettiest one in the travel show, began with the words "After the storm ..." and continued how after your travels there was nothing better than to "Come on home ..." It was obvious that the song had to be preceded by a storm as part of the show's grand finale. Achieving the desired results strained even our usual resourcefulness in a new direction.

We first put together a really violent thunderstorm from sound effects records to provide the audible rain and claps of thunder.

Fading in after the second to last song, the quadraphonic tape would blend into the beginning of the band's last piece. The storm's aural ambiance complete, we had to create the visual thunderstorm.

Lightning is a standard visual effect: a small photo strobe mounted in a small single slide projector. When discharged, a hi-contrast image of a lightning bolt flashes on the dome. Time it to a clap of thunder and you have an approximation of the real thing. They're good, but we wanted the audience's experience to be something more. That's when we hit on using charges of flash powder to simulate nearby bolts. A small amount of the explosive material was poured into a hollow on wooden, disk-shaped flash pots after a piece of nichrome wire was stretched over the depression between two screw terminals on either side of the disk. Flipping a safety interlock and a switch at the control console instantly heated the wire and ignited the powder, producing a loud bang and blinding flash. There still was one missing element we had to work out. What's a heavy-duty storm without driving rain? Obviously we couldn't install an elaborate sprinkler system to shower the audience from above, so we relied on two large theatrical wind machines mounted on tall, wheeled carts. Giant fans to make rain?

As the thunderstorm began to build from the pre-recorded tape, strobe lightning flashed on cue with peals of thunder, the closer claps accented by flash powder "lightning." The driving rain? With both fans blowing, their prop wash directed from side to side, industrial-sized squirt bottles sprayed water across their fronts. As the droplets hit



Flash Pot - After running a piece of nichrome wire across the terminals a small amount of flash powder was carefully poured into the "well" on the wooden disk. When 110V was applied to the wire during the show, it instantly became red-hot, igniting the powder resulting in a blinding flash and a loud KA-BOOM. Basically a standard theatrical effect used anew. All illustrations by the author.

the air stream they were blown out into the audience. Listening to a tape recording we made during one of these shows over ten years ago, you can still hear the crowd's over-enthusiastic reaction amid the audio thunderclaps and pops of flash powder. While this kind of planetarium presentation differs greatly from people's traditional expectations, I've always found them to be creatively satisfying, especially when they cause this strong a response.

Getting such reactions is difficult considering they can only be accomplished through sight and sound. One feeling we hope to convey is a sense of wonder about the universe that surrounds us. Sometimes just seeing the planetarium's starfield is enough. Other times acquiring a sense of wonder may take something more.

Our most recent production, "State of the Universe," offers how our perceptions of the cosmos have changed as ways of observing it became more sophisticated. In closing we consider one of its theorized fates. Expanded to an unknown limit, gravity may pull it all back together like an over-stretched rubber band.

Dealing with billions of galaxies, the visuals had to convince the audience that this change would affect a cosmos of objects. A large number of galaxies had to expand across the dome, reverse direction, then collapse into a small area. This would be impossible with conventional zoom projectors unless we had a lot of them. In fact we only have one with a bright, 1000-watt arc lamp, but that doesn't have sufficient light output to do the job even if it did have a wide field projection lens. As it turned out the solution used standard projection lenses and 300-watt light sources. And what Rube Goldberg contraptions these projector turned out to be.

They began as three cylinders of thick cardboard about five inches [13 cm] in diameter and five inches long. A sheet of rubber was stretched taut and glued across one end making what looked like a cheap set of toy tom-toms. Small, square, first surface glass mirrors were then glued on the surface of the rubber drumhead. The tubes were then fastened horizontally across boards so the mirrored drumheads were flush with one end of the boards. A reversible motor with a cam and rod mechanism was mounted directly behind each tube so that the rod entered the open back of the tube and rested against the rubber sheeting. Voila! You have an expanding and collapsing universe ... or you almost do as we've only the method of setting the whole thing in motion.

A single slide projector was pointed toward each of the drumheads so that the "cluster of galaxies" image each threw fell on one set of the tiny mirrors and then out onto the dome. To make the galaxies all seem to

rush away from one another as if after the Big Bang, the motors turn the cams forward, pushing the rods against the rubber sheeting. As it stretches, the mirrors move apart from

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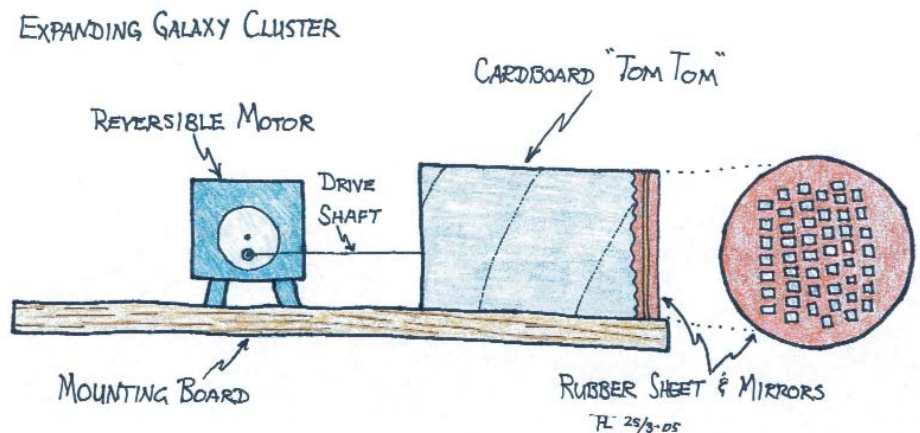
each other. With each small mirror projecting some part of the slide projector's image, the galaxies appear to flee from each other across the planetarium dome. To simulate how the universe might collapse upon itself in the distant future, you run the motor in reverse. The rubber sheeting resumes its shape, carrying the tiny mirrors with it.

At this point in "State of the Universe" we're contemplating the simultaneous death of the cosmos as we think we understand it and the birth of a whole new one, which we can never hope to know. Following the demise of our universe a new one is created in the biggest Big Bang in planetarium history; 110 colored strobes led off by a gigantic white one with a reflector about 20-inches

[50 cm] in diameter, which was once used on aircraft carriers in broad daylight to wave off planes making bad approaches during deck landings. Show scenes can also move you physically as all these flashes of high intensity light go off unannounced.

While planetarians know what most of the astronomical objects they recreate look like, there are others which must be based on best scientific guesses. "What does an invisible black hole look like?" might be a question posed today just as recently as a decade ago the same question might be asked of Venus's cloud-enshrouded surface. Fortunately, the American Pioneer Venus and Soviet Venera probes have given enough of an answer that the landscape of Earth's so-called twin can be represented with a high degree of accuracy.

Unfortunately, there are some objects whose true appearance will elude us for a long time. Quasars readily come to mind. The most distance objects known, they got their names because of their quasi-stellar appearance. Seen through a telescope, a quasar looks no different than the foreground stars of the Milky Way it appears against. Only when you take their spectral "fingerprints," or observe them in non-optical portions of the electromagnetic spectrum, does a quasar's incredible properties become apparent. Receding faster than any other objects in the cosmos, they have energy outputs thousands of times greater than a normal galaxy. Minute fluctuations in these prodigious displays indicate that quasars are relatively small, perhaps only as large as the diameter of the solar system. If that isn't puzzling enough, highly detailed views of closer quasars show they are surrounded by what astronomers call "fuzz" for lack of a better name. Current theory speculates that this fuzz is the outskirts of a very young galaxy, making the quasar an area of intense activity



Expanding Galaxy Cluster -- As the drive shaft moved inward the rubber sheet over the end of the tube pushed out, spreading apart the small mirrors glued to the sheet. A single slide projector aimed backwards toward the mirrors provided the cluster of galaxies that were in turn reflected out onto the dome. Reversing the motor and the expansion collapsed.

at its center. But what process powers the galaxy's core remains to be seen.

"State of the Universe" considers these enigmatic objects. To first show how quasars are found all over the sky and at varying distances we needed a way to keep their images small, but bright. The six Carousel slide projector, wide-angle all-sky system was a possible choice, but it didn't meet the brightness requirement. While the audience's eyes would have become dark adapted at this late point in the show, the all-sky just couldn't deliver the quantity and quality of light befitting the awesome nature of quasars. "Quasar cans" attached to the back of the dome was the best solution.

Cans are a fairly common planetarium effect; simply a tin can with a light bulb socket mounted inside. Since a dome is made of perforated aluminum (there are over 80 million holes in the Albert Einstein Planetarium's - we calculated it once) when a can's light bulb is on, it shines through, making a circular spot of light in the sky the same diameter as the can. The can's name comes from what you sandwich between its front and the back of the dome. For example, a piece of plain typing paper can make it a "sun can," while a drawing of the moon makes a "moon can." I once used both to show special rising and setting points of the sun and moon relative to a panorama horizon scene of Stonehenge. As simple as cans are, they can be quite effective. One of the best uses I've seen is to mark the sun's hourly path across the sky for the shortest day of the year (the Winter Solstice), the days of equal day and night hours (the Vernal and Autumnal Equinoxes) and the longest day of the year (the Summer Solstice). Combined with the motions of the planetarium instrument and you have a powerful teaching tool for learning the reasons for the seasons.

Using a piece of polar coordinate graph paper, Jim Sharp and I mapped out the locations of 20 quasar cans. These differed from traditional cans by having different wattage light bulbs, colored filter gels that ranged from clear to yellow to red to deep red and different diameter apertures over their open ends to better control the quantity of light they admitted. Why so elaborate? The farther a quasar is from us the dimmer and redder it will be. A quasar can for a relatively nearby object would have a higher wattage bulb, a clear filter and a large aperture. Our most distant quasars have the lowest wattage bulbs, deep red filters and the smallest apertures.

After Jim and I had worked out where we wanted the quasar cans, their positions had to be converted into coordinates that would make sense to the NASM audio-visual technicians who would have to install them. The planetarium dome itself provided us with

the perfect solution.

One simple, yet accurate, coordinate system has two axes; one horizontal and one vertical. Azimuth and altitude, the horizon coordinate system, is an example. In the case of the planetarium dome, its structure supplied half the necessary coordinates. Sixty equally spaced ribs that reach from a concrete support ring at its base to the zenith where they are joined by a common ring support its 271 perforated aluminum sheets making up the hemisphere. By alphabetizing the ribs (A, B, C, ... Z, AA, BB, etc.) we had our horizontal scale. The vertical component turned out to be almost as easy.

Imagine the steps it takes to make a fresh brewed cup of coffee, or a bacon, lettuce and tomato sandwich. Now picture the interleaving sequence of events if you are preparing both together. By extension, then, you might be able to imagine preparing over a hundred different foods simultaneously in the space of half an hour. This is what it's like to coordinate the automation programming for a presentation.

To install effects projectors behind the dome and check the condition of audio loudspeakers, or air ventilation ducts, there is a special ladder made for hemispheres like ours. Mounted on a pair of wheels at its base, the ladder curves along the back surface of the dome, ending at a pivot at the top. It's kind of like the ladders used in a library, or in an old fashioned general store. Rather than slide left and right parallel to a bookcase, or a set of store shelves, the dome ladder can be pushed around parallel to any point on the outside of the dome's surface. With 90° from base to zenith it's simple to calculate how many degrees of elevation in the planetarium sky equals one rung on the dome ladder. The only problem was that one of us had to climb the ladder and count the rungs.

Jim volunteered, which was just as well as there was no way that I was going to. Heights (at least from a ladder, or similar support) scare the neutrinos out of me. Regular ladders are bad enough, but let me remind you that this one is far from regular. At the base you climb vertically. The higher you climb, the more the ladder approaches the horizontal. By the time you reach the zenith you're climbing the rungs while lying almost on your stomach. Doesn't sound too bad to you? As you climb you see right through the perforations in the dome's aluminum sheets down onto the audience's seats and the floor of the planetarium chamber some 50-feet [15

meters] below. It's even more unsettling if you're close to the zenith and the planetarium projector is lowered in its elevator shaft. One has the distinct impression of climbing horizontally in free space over a deep dark well. And there's no place to step off of the ladder either. If you miss a rung and step onto the back of the dome there's a chance that you will either dent it, or punch a panel free from its rivets. This doesn't mean that I haven't gone to the zenith on the dome ladder. I did once, but I was much younger and more foolish then.

One other consideration; it helps to have someone steady the ladder's base. Those same wheels that allow the ladder to be pushed around the perimeter of the dome also cause it to disconcertingly shimmy from side to side as your weight shifts during your ascent. But then again, this can work to your advantage. You can climb up part way, then pull the ladder and yourself around by using the dome's horizontal rib pipes as long as you remember to duck the ventilation ducts.

After I held while Jim climbed and counted, we converted the azimuth and altitudes we had marked on the polar graph paper into "dome ribs" and "ladder rungs" so the audio-visual technicians could install the quasar cans on the back of the dome.

With 20 cans representing distant quasars installed we still needed a spectacular quasar as seen close up. Since nobody knows how they appear from such a distance, we had a certain amount of latitude to work with as long as we stayed within the bounds of what was known. We needed something brilliant and blue. Blue? The quasar cans ranged from colorless to deep red, but that was because they are far away.

Quasars emit a tremendous amount of energy at the blue end of the electromagnetic spectrum, which is what originally brought them to astronomer's attention on photographic plates. A simple, yet elegant, special effect from an earlier show came to our rescue.

An argon laser produces an intense point of blue-green light on the planetarium dome even after traveling about 70-feet [21 meters] to get there. Unfortunately, it's also pretty boring just by itself. Passing its light through a turning piece of glass randomly covered with spun glass "angel hair" improves it considerably. Not only does this produce constantly shifting spikes of light that radiate from the blue laser spot, it also makes a diffuse glow where they converge that's analogous to the young galaxy "fuzz" seen around real quasars.

Even though we had created a pretty effective quasar simulation, there was still an aesthetic matter to consider. Lasers only have two operational states; ON, or OFF.

They can't be faded up and down like a light bulb in a conventional special effects projector. It would look pretty poor artistically speaking to fade on the distant quasar cans only to have the laser quasar suddenly snap on. A cheat was devised to make the laser also appear to do so. Yet another variation of a plastic wheel was the solution.

Since the output of the laser couldn't be changed, a clear motorized wheel spray-painted with a smoothly graded layer of opaque black paint produces the dimming effect. As in the case of many special effects projectors, it's the timing of the commands of the automation programming that ensures visual success. Written out in longhand the automation sequencing for this part of the show might look something like this:

- 1) turn on laser's power supply to allow it at least 30-seconds to begin lasing...
- 2) select direction of motor driving painted dimmer wheel to FORWARD ...
- 3) begin rotation of dimmer wheel from most opaque section of wheel to clearest section at a voltage to its motor that will make the laser quasar appear to fade up over 10-seconds at the same time that the quasar cans are fading up over 10-seconds ...
- 4) stop rotation of dimmer wheel when at its clearest section ...
- 5) change direction of motor driving dimmer wheel to REVERSE ...
- 6) start fade out of quasar cans behind dome at about a 10-second rate and begin reverse rotation of dimmer wheel so that its opaque section (which will fade out the laser quasar) is reached in the exact same amount of time as when the effect was faded in; this will ensure a

Imagine the steps it takes to make a fresh brewed cup of coffee, or a bacon, lettuce and tomato sandwich. Now picture the interleaving sequence of events if you are preparing both together. By extension, then, you might be able to imagine preparing over a hundred different foods simultaneously in the space of half an hour. This is what it's like to coordinate the automation programming for a presentation.

consistent start/stop point for the effect show after show ...

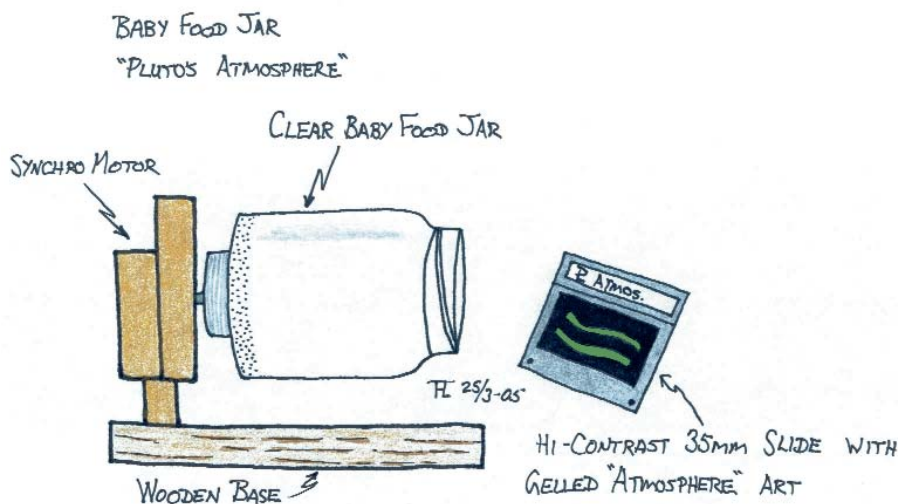
- 7) shut off the laser's power supply once the dimmer wheel on the laser quasar has stopped turning ...

There may be hundreds of such slide and special effects projectors in a show, each with its own requirements for operating on time and at the right speed, lamp level, slide number, etc. And, it's not unusual for several projectors to be in operation at the same time. It's easy to see that programming can be a major dose of mental gymnastics. If you can think in logical linear sequences for long stretches of time you might have a chance of being successful at it.

Imagine the steps it takes to make a fresh brewed cup of coffee, or a bacon, lettuce and tomato sandwich. Now picture the interleaving sequence of events if you are preparing both together. By extension, then, you might be able to imagine preparing over a hundred different foods simultaneously in the space of half an hour. This is what it's like to coordinate the automation programming for a presentation. And that's not making sure that a particular step in a recipe is carried out on the right fanfare of music, or in synch with a sound effect, like a clap of thunder.

It can be very rewarding when a planetarium show impresses a research astronomer with a scene about their specialty. Fortunately, this is exactly what happened opening night of "PROBE," an odyssey through the solar system. James Christy at the Flagstaff, Arizona station of the United States Naval Observatory in 1978, had found a moon circling Pluto a few years before the show was produced. Robert Harrington, the astronomer who derived its orbit at the Observatory's Washington, D.C. headquarters, was asked what Charon might look like from Pluto's surface. A simple calculation taking the satellite's diameter and distance into account would then tell us how to photograph a scientifically based artwork of Charon so that it would appear the correct angular size in the sky. During the premiere I sat two rows behind Harrington to try and catch his reaction to the scene firsthand. Uranus and Neptune far behind, a 360° panorama of Pluto appeared, a few stray wisps of the planet's very tenuous methane atmosphere suspended over its frozen surface. These bits of thawed gas were slides of clear wavy horizontal lines on a dark film background projected through rotating baby food jars. Charon hung overhead, illuminated, like Pluto, by a brilliant though distant sun. As soon as the scene had established itself I saw Bob extend one arm with a closed fist; he was estimating the apparent angular size of the satellite. After the show was over I asked him what he thought of the Pluto scene. "Not bad ... it looked about right." Those six words were the high point of my evening.

Special effects in planetarium shows have come a long way since they were introduced in the 1950s. As long as new discoveries are made in astronomy and people want to learn about them, planetaria will continue to invent new and innovative ways to depict them. New equipment and techniques, like video projection and computer graphics, will be a part of this future. For the present, however, we'll continue to save baby food jars. You never know when you might need one. ☆



Baby Food Jar "Pluto's Atmosphere" -- The gelled hi-contrast image was projected through the slowly rotating clear baby food jar. Several of these shown over a panorama of Pluto's surface gave the appearance of a thin wafting veil of atmosphere.

What the Heck is a Planetarium Anymore?

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My fellow planetarians,
What follows is an essay reflecting both personal and professional views about the state of our chosen profession. I hope you'll take the time to consider the questions posed, and will offer your own opinions here in response.

In March, 1994, Dr. George Reed published an article in the *Planetarian*, provocatively titled "Who in the hell needs a planetarium?" A worthy read then; still interesting more than a decade later (and now we can say, "it's only a click away", at <http://www.griffithhobs.org/IPS%20Planetarian/IPSWhoNeedsPlan.html>). I mention this because I'd like to take the question a step further. These days more and more I find myself pondering: "What in the heck *is* a planetarium, anymore?"

As many of you know, since 1977 I've maintained a database of the world's planetariums. It's what Loch Ness Productions uses every day to run its operations; it contains the data we publish as *The LNP Planetarium Compendium*; it's what I used to generate the *IPS Directory* when I was Treasurer/Membership Chairman in the late 1980s. From its start on punch cards (!) through microcomputer paper tape to floppy disks to CDs to HTML documents, I've probably spent more time massaging and working the data, and become more familiar with the corpus of the "planetarium community," than anyone else in the world (would want to be).

I don't say this to brag; it's just that nowadays, "things ain't what they used to be." This is good - it shows that evolution is not a theory, it's a fact! But it also gives one pause, especially when issues that are fundamental to one's chosen profession seem to morph before one's eyes after years of relative constancy.

Naturally, the structure of the planetari-

um database has evolved a bit over the decades. I made more work for myself as I added new data items to track: classifications (school/university, museum, etc.), seating layouts, gift shops, attendance, staff positions, e-mails, web sites, and more. But the original fields I started with for each data entry were:

- Planetarium Maker
- Projector Model
- Dome size
- Number of seats

What I'm finding is that even these basics - though seemingly obvious and clear-cut - don't adequately reflect the "reality" of the state of today's planetarium.

In the olden days, "the planetarium" was a unique place. You had a round room with a

... nowadays, "things ain't what they used to be." This is good - it shows that evolution is not a theory, it's a fact! But it also gives one pause, especially when issues that are fundamental to one's chosen profession seem to morph before one's eyes after years of relative constancy.

dome overhead and a mechanical star projector in the middle. There were a certain number of seats under the dome. A pretty straightforward and unambiguous definition - and singular. There was *one* dome, one star projector, one theater. Very simple, very easy.

Then the Starlab portable planetarium arose onto the scene. Now the "round room" was removed from the definition. Portables don't have fixed numbers of seats; they have a generic "capacity". And a goodly number of fixed-dome facilities in major metropolitan areas acquired one or more portables for outreach programs and such. All well and good ... but now "the Farley McCluth Planetarium" as an institution is bringing the planetarium experience to the public through multiple venues - there is more than one dome, more than one star projector, more than one theater. You could present a planetarium show using a Zeiss in one theater and a Starlab in another.

So, now the simple questions can't be answered so easily. When you ask "how many planetariums are there in the world?" does a facility with one fixed-dome theater and three portables count as one planetarium, or four? When you ask what "the planetarium's attendance is" should we be talking about a grand total of fixed and portable attendance, or should those be tracked separately, since the chances are good that different programming is presented in each? What is significant? And - in the theme of this essay's title - who in the heck cares?

Then there's the simple query "What year did a planetarium open?" Let's say a facility starts out small with a Starlab, and then a few years later builds a fixed-dome theater. Or maybe they build an entirely new facility across town, all new equipment, new staff, and all vestiges of the old place are demolished. Does the "year of opening" refer to the institution, the theater, or the installation of the current projector?

Time was, we had planetariums with one big dome and maybe some portables. But even this exemplar has changed. Now you find more and more planetaria with *multiple* fixed-dome theaters - Adler in Chicago; the Buehler Planetarium in Davie, Florida; the Pennington in Baton Rouge, Louisiana, to name just a few (oh, and they also operate portables). In these cases, the definition of "the planetarium" has expanded to include multiple star theaters operating under the aegis of a single institution.

For many years, through a proliferation of theaters, it was still mostly "one projector per theater." Then Cocoa opened in 1994 with both an analog and digital star projector in the same theater. So, when you would look up "Projectors" in the *Compendium* index, their theater would show up twice. Okay, one could cope with that.

But since then, things have degenerated completely in terms of projector classification "like the olde days" when there was a star projector - a specialized device in the center of the room for creating stars on the dome. Now even *that* has changed. These

Mark C. Petersen was IPS Treasurer and Membership Chairman from 1985-1990. This article with hypertext links can be found at <<http://www.lochness.com/pltref/wth/wth.html>>.

days, you can have *seats* in the middle of the theater instead of a star machine, and quite generic video projectors around the periphery. The stars on the dome shine from those video projectors, but upstream, they can come from a variety of sources. Take the Eugenides Planetarium in Athens, Greece. It has multiple video projectors around the dome, fed by both Sky-Skan's DigitalSky and Evans & Sutherland's Digistar 3. There is no "star projector" per se. Actually, Athens does have a star projector - it's their old Zeiss IV under a separate dome in their lobby as an exhibit. Should I keep track of that in my database? And if so, how, and why, and does anyone care?

It used to be that planetarians delighted in debating the quality of the starfields produced by the various projector manufacturers - through pinpoints from arc lamps, plates and lenses, to fiber optics. Now, with fulldome video the apparent medium of choice, the old criteria of comparison no longer apply.

Let's say you have a new SciDome from Spitz. You don't have a "Spitz starfield" like you would if you had an A3P. Your stars are generated by the software application Starry Night. Or, you could run a fulldome video show produced by, say, Loch Ness Productions. We use DigitalSky to generate our star fields, so could you say the stars on your dome came from Sky-Skan? Does it matter to the audience? To you? You could also run the open-source software Stellarium in fish-eye mode to display stars ... or Partiview, or Digital Universe ... or create your own starfield generator program. You could have a myriad of starfields, all in one show, if that floats your boat.

My point is, no longer is "the quality of the starfield" you project necessarily dependent upon the vendor from whom you buy the equipment. The quality and method of the video projection itself is the new arguing point.

So, given all this folderol, I'm left wondering what to do when trying to fill in a field called "Projector model" in my database. The combination of software and hardware - basically a computer hooked up to a video projector - certainly doesn't seem like the unique, specialized planetarium star projectors I've been keeping track of in my database all these years.

Which brings me to this: if there is no significant star projector in a planetarium anymore, why would/should anyone try to keep track of such things anymore? I suppose I could maintain an equipment list inventory for a given planetarium facility - but does this really matter to anyone anymore? Did it ever?

It used to be that a planetarium staff would renovate its theater, and upgrade the star projector to a more capable model, and

... if we're no longer planetarium show producers, what in the heck are we? Must we succumb to that overwrought descriptor: "content providers"? As John Stoke astutely opined, "Shakespeare was not a content provider!"

that was a significant event. Planetarians wanted to be sure their published entries included mention that "the planetarium was refurbished" in a certain year. These days, one can swap out computers, operating systems, video projectors ... and it's just routine, no big deal. You can have the WhizBang 1500XLT video projector, and upgrade to the MondoWhup 3200EXS, and no one but the accountant will raise an eyebrow. Of course, it used to be you had to save up the capital over several years to upgrade; nowadays you can buy entire fulldome systems for the cost of an upgrade of yesteryear.

The "that was then, this is now" philosophy is brought home even more strikingly, when at conferences and such we hear comments like, "This fulldome stuff isn't even about planetariums any more; it's just video games under a dome."

Again, what in the heck *is* a planetarium, anymore?

Let's say you build a new facility, and beneath your dome you put seats and video projectors, the computers and software, the sound system, and all. On Central Park West in New York City, they call such a place the Hayden Planetarium at the Rose Center for Earth and Space, and they show their stuff to more than a million people a year. A couple of miles away is another domed facility where beneath their dome they've put seats and video projectors, the computers and software, the sound system, and all. It's in Madame Tussaud's Wax Museum. What makes one a planetarium and the other not? Or can one even make the distinction? Is it the content, the show material presented? Granted, the facility's mission statements are different ... but still. Produced in dome master form, a show created by either facility *could* show on the other's theater's equipment. Madame Tussaud's already runs the London Planetarium; with a simple change of signage, they could have another one in New York City if they wanted.

Still in New York, but farther "down the road" on Long Island, you can see the Loch Ness Productions planetarium show "HUBBLE Vision" in classic (slide-based) form at the Vanderbilt Planetarium. A little farther east on Long Island, you can see "HUBBLE

Vision" in fulldome video form on the Digitarium Alpha at the planetarium of Suffolk County Community College in

Selden. From the audience's viewpoint, the visual material that appears on the dome is the same, or pretty close; the soundtracks are identical. One facility has a classic star projector and banks of slide projectors; the other has a video projector and computer in a box. Each one bills their theater as a planetarium.

It's obvious to me the argument about "fulldome being just fancy video games and not a planetarium" is demonstrably spurious, especially in this example, but I wouldn't be surprised to hear more similar wails in the future.

We've even heard it said that the types of shows Loch Ness Productions creates aren't really planetarium shows at all. If one limits the definition of "planetarium show" to a *show of a planetarium projector* then that could be true. Our multimedia style shows are definitely not analog star projector demonstrations - no explanations of how the machine in the center of the room displays diurnal motion and latitude movement, for instance. But they *are* presentations optimized for display in a planetarium environment - darkened room, stars on the dome overhead, theater sound. And frankly, when hundreds of places calling themselves planetariums run our shows, by default, our programs have to be called planetarium shows!

Still, the definition of "planetarium" is kind of crumbling at this point. Many digital dome theaters debate whether or not to even use the term "planetarium" with regard to what they do. Said one executive director of a museum with a fulldome theater: "the minute you start mentioning the word 'planetarium,' what you're saying is 'Boring!'" The theater director had to come up with a good reply to that.

Yes, using the term planetarium when billing a digital dome theater can indeed be quite limiting, especially when you can show *any* content in your theater, not just the astronomy topics. Why associate yourself with and reinforce the negative impressions given our hallowed term "planetarium" by TV shows such as "South Park" and "WKRP in Cincinnati"?

Perhaps we at Loch Ness Productions should come up with a more appropriate term for billing our creations; maybe calling them "planetarium shows" isn't doing them justice, especially in their fulldome video form.

But if we're no longer planetarium show producers, what in the heck are we? Must we succumb to that overwrought descriptor:

“content providers”? As John Stoke astutely opined, “Shakespeare was not a content provider!”

It’s these sorts of things that drive me batty late at night.

Regardless of the definition of planetarium, I can safely say that since the time I started keeping track, the world’s population of these danged domed things has doubled. What was once a very unique specialty is now commonplace - a commodity. Is this a

good thing, or too much of a good thing? Now anyone and everyone can have a planetarium in the comfort of their own computer - as well as an audio recording studio, a video editing studio, a photo lab, a library, and with Internet access, “live” images from Mars and Saturn piped in daily for free. A marvelous world we live in, when something that once was miraculous and wonderful is now routine, eh? Or not.

In conclusion, then, I return to the basic

question:

What in the heck is a planetarium, anymore?

This article was first posted as a message on Dome-L (Dome-L@topica.com) on January 27, 2005. It is also posted in HTML form in the Planetarium Reference Library section on the Loch Ness Productions web site <http://www.lochness.com/plttref/wth/wth.html>. Copyright 2005, Loch Ness Productions. Reprinted with permission. ☆

John Ebdon

22 December 1923 - 19 March 2005

John Ebdon, Director of the London Planetarium from 1968 to 1989, died in March after a long battle with cancer.

John used to say that his love of astronomy was nurtured very early by his nanny, whose passions in life, he used to say, were astronomy, himself, and gin - in that order. Unlike most planetarium directors he was not a scientist, but he valued and believed in astronomy as a key to the greater understanding of a diversity of subjects, from literature to theology, and from arts to social behaviour.

His regular planetarium programmes reflected this, ranging from talks on poetry and astronomy, and on Chaucer and mediaeval cosmology to the standard educational fare for primary and secondary students. His Chaucer lectures included large chunks of *The Canterbury Tales* which he delivered in what he thought was a pretty good imitation of middle English pronunciation (but which was very nearly unintelligible to most students!).

He also pioneered short talks for children with learning difficulties; and, at the other end of the scale, for gifted children, whose more precocious comments he much enjoyed. A smart boy of about six asked why John had not mentioned Sirius B in his talk, while another child of four or five, clearly unimpressed with what she had heard, lisped, “my Daddy thayth there’th a pulthar in the Crab Nebula and he’th cleverer than you.” He was also amused at an outraged mother who marched her child out of the planetarium on hearing the apparently shocking phrase “homo sapiens”.

Although he was brought up on the classic planetarium talk embellished with one slide projector and a pointer (in his case always a very shaky one!), he was impressed with the semi-automated show produced by Ian McLennan, which brought to the planetarium a more modern style; but less than enthusiastic about the introduc-

tion of Laserium, in spite of its initial popularity. The historical Astronomers’ Gallery exhibition featuring six great astronomers, was much more to his taste; it was the scene of Silver Jubilee celebrations, which perhaps was the high point of his tenure. Many of the guests will have found it hard to forget the double act which he and Patrick Moore performed from the control desk, both vying to spot Mars in the sky before the other. John retired in 1989, while his beloved Mark IV Zeiss projector was still in use, and visited the planetarium only once more.

Before taking on the job of lecturer, he had been the only “Pom” in an Australian squadron of Spitfire pilots during World War 2, and had (by his own admission not very successfully) attempted to sell skins in Africa. He developed a huge affection for that continent, as he did later on for

Greece, where he found a rich fund of characters and anecdotes on which to base a number of radio programmes and books. His parallel life as a broadcaster brought him a large fan club, mostly of elderly ladies, who enjoyed his regular 15-minute talks which wove together inconsequential oddities from the BBC Sound Archives, and always ended “If you have been, thank you for listening”.

These talks to a great extent summed up his character. Although he did not suffer fools gladly, and infuriated some, he was a courteous and amusing man, punctilious in his own use of language, and keenly observant of the linguistic foibles of others, whom he would imitate to perfection. But always without malice, for his humour and sense of the absurd was of a gentle and old-fashioned kind - from an age which has all but disappeared.



John Ebdon, Director of the London Planetarium, 1969-1989. © London Planetarium.

Explore the Edge at the Adler Planetarium: IPS 2008

Paul Knappenberger, President
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Would you like to attend an IPS conference that includes with a moonlight dinner cruise or dining on the 100th floor of one of the world's tallest buildings? Do you like the sound of live blues music or would you rather listening to a lecture by a famous scientist? Does "cutting-edge" planetarium technology stir your imagination or does a behind-the-scenes tour of a world-class collection of ancient astronomical instruments sounds more intriguing? If you find one or more of these possibilities appealing, we invite you you will definitely want to come *Explore the Edge* at Adler Planetarium in Chicago for IPS 2008.

As the first planetarium in the Western Hemisphere, the Adler has maintained its historical reputation for "Exploring being "on the Edge." Indeed, shortly after the construction of the Adler's most recent addition, a *New York Times* article affirmed this edgy reputation: "It looks like a U.F.O. landing on the edge of Lake Michigan." Judge for yourself. (Fig. 1)

A Chicago conference in 2008 would be a fitting point in time and space to *Explore the Edge*. Consider:

- 2008 is the 50th anniversary of the U.S. space program—the Explorer 1 satellite launch to the "edge" of space.

- "cutting-edge" technology will be displayed by vendors at the conference.
- local scientists at the University of Chicago's Kavli Institute for Cosmological Physics (KICP) and Fermi National Accelerator Laboratory – potential sites for pre- or post-Conference trips – study the "edge" of the Universe at both vast and minuscule distance scales.
- a dinner cruise on Lake Michigan could go out to the "edge" of the city (horizon); alternately, a dinner in the sky-deck at the top of Sears Tower or in the Signature Room 95 floors up in the John Hancock Building could reach the vertical "edge" of the city.
- NASA's Interstellar Boundary Explorer (IBEX), the first mission designed to detect the edge of our Solar System, launches in 2008. Fittingly, the Adler has been chosen to lead the Education and Public Outreach efforts of this great mission.

For all its "edginess," the Adler also has the advantage of its central location in the U.S. Chicago is a continental transportation hub for air, rail, and motor-vehicle travel. This convenience will allow for a maximum number of planetarians to attend the conference by minimizing travel time and expense.

The Adler plans to host the conference the week of June 15-20, 2008, as historically local hotel rates begin to rise after that week due to the annual influx of summer tourists.

In addition to ease of travel, the Adler's proximity to Chicago's central business district will offer conference-goers a wide array of lodgings within a short distance. The Adler has at least three sites specifically targeted for IPS. The Chicago Hilton, one of the city's largest hotels, is the closest major facility of its kind to the Adler. It offers a range of room sizes and prices, as well as meeting rooms and exhibition halls that can easily accommodate the 400 to 600 participants expected to attend. Its sister facility, the Palmer House Hilton, is less than a mile north and has its own assortment of meeting and guest rooms.

Acknowledging the cost-conservative nature of most planetarians (including those at the Adler), quality accommodations were also sought at a price-point considerably less than the standard rate for a downtown Chicago hotel room. Only a few blocks away from the Hilton hotels is University Center of Chicago, a newly built 18-story structure designed to house students of the numerous downtown Chicago institutions, including DePaul University, Roosevelt University, Columbia College, and Robert Morris College. Nicknamed the "Superdorm," University Center would offer the IPS conference about 200 freshly appointed, bright, spacious rooms, currently in the \$75 to \$90 per-night range. University Center also has its own food court as well as meeting rooms and a landscaped rooftop garden.

Both Hilton hotels and University Center are a quick ride from the Adler by either taxi or public transit—or a scenic 20 to 30 minute stroll along Lake Michigan and through beautiful Grant Park.

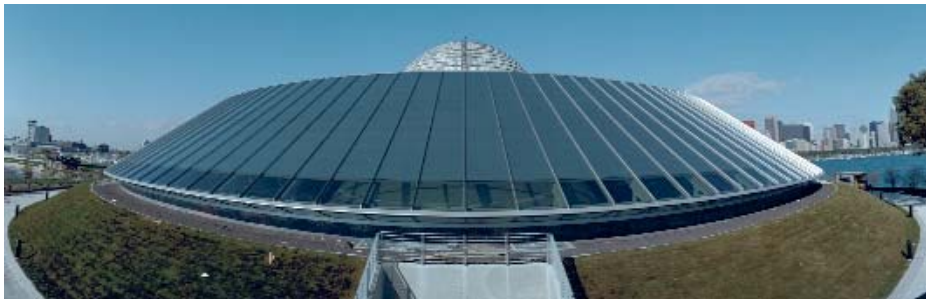


Fig. 1: Eastern exterior of Adler Sky Pavilion, daytime; Courtesy Adler Planetarium Photographer Craig Stillwell.

This is the first of two articles that invite the membership to choose a conference venue for 2008.



Fig. 2: Sky Pavilion interior with banquet arrangement; Courtesy Adler Planetarium Photographer Craig Stillwell

The Adler itself is well suited for an international conference. (Fig. 2) Since it last hosted IPS in 1980, the Planetarium has significantly increased its staff, now numbering nearly 200. In addition to its innovative Production and Theaters staff, the Adler now has professional staff in the Departments of Astronomy, History of Astronomy, and Education, who work together to meet the needs of a broad range of audiences. More than 150 Adler volunteers also extend the services of the Planetarium beyond the



Fig. 4: Sky Theater with Zeiss Mark VI projector; theater seating removed; Courtesy Adler Planetarium Photographer Craig Stillwell.

museum walls into Chicago-area communities through a variety of observing events and other educational activities.

Also since 1980, the Adler has expanded its physical facilities, most recently adding over 5,600 square meters of new exhibition space. This expansion included the StarRider Theater with a state-of-the-art Digistar 3 system (Fig. 3) to complement the Adler's existing Sky Theater with its Zeiss Mark VI projector and its removable seating (Fig. 4), and its



Fig. 3: StarRider Theater with Digistar 3 system; Courtesy Adler Planetarium Photographer Craig Stillwell.

multimedia Universe Theater. Each of the theaters accommodates over 200 seats.

In addition to its three primary theaters, the Adler has a number of meeting areas that can accommodate smaller groups with specific needs including paper sessions and workshops. State-of-the-art technologies are deployed throughout the Planetarium, including wireless internet connections, digital audio/video equipment and teleconferencing capabilities, and multiple platform hardware/software computer resources. Adler's CyberSpace Center, which opened in late 2001, consists of three components: a 16-unit computer classroom, a broadcast studio that can double as a meeting room, and an electronic exhibit display area with 17 plasma screens that have been successfully used in previous conferences for electronic poster presentations.

The Adler's Doane Observatory, housing Chicago's largest public telescope (a 50-cm cassegrain reflector), is another facility that would serve the special interests of planetarians, for meeting space in the daytime tours and for telescope viewing at night. (Fig. 5) For those astronomers who prefer somewhat larger scopes, the Yerkes Observatory—the world's largest refracting telescope—is just a few hours away by motorcoach. A visit to Yerkes is being planned as an extra-Conference excursion. Additional pre- and post-Conference excursions may include visits to FermiLab and Argonne National Laboratory..

The Adler is also close to, and maintains working partnerships with, numerous local

research entities. Historically the Adler has been aligned with both the University of Chicago and Northwestern University. The Adler's charter, dated 1928, requires its scientific content be monitored for quality by the Astronomy Department of the U of C. And Philip Fox, the Adler's first Director when it opened in 1930, was hand-selected by Max Adler from the Northwestern University faculty. More recently, the Adler has enlisted professors from the U of C and Northwestern to serve as working astronomers at the Adler. Our relationships with astronomers at Loyola University, University of Illinois at Chicago, FermiLab, Argonne, and other local science institutions contribute to the vibrant research community that surrounds the Adler.

Even closer than these institutions are the Adler's two closest neighbors. The Field Museum of Natural History and the John G. Shedd Aquarium, both leaders in their own scientific fields, comprise with the Adler the parkland known as Museum Campus Chicago. A short drive away from the Museum Campus are the world-renowned Art Institute of Chicago and the Museum of Science and Industry. A lakeside walk (or water-taxi ride) from the Adler brings visitors to Navy Pier, currently Chicago's most popular tourist attraction with two museums, two theaters, a 45-meter illuminated Ferris Wheel, and numerous other amusements. In fact, the cultural institutions close



Fig. 5: Interior of Doane Observatory; Courtesy Adler Planetarium Photographer Craig Stillwell.



Fig. 6: Aerial view of Adler Planetarium and environs; Courtesy Pacific Construction Services, Inc.

to the Adler are so numerous that their descriptions would easily fill an entire *Planetarian* article on their own.

The Adler's Chicago setting would give IPS conference-goers and their families the advantages of convening in a world-class city, with its wealth of ethnically diverse neighborhoods, its array of fine dining, its groundbreaking architecture and public artworks, its professional theaters and music venues of every genre, and its wide range of spectator sports (including the Cubs and White Sox).

However, as urbanized as Chicago is, it has also maintained much natural beauty, per the City's Latin motto *Urbs in Horto*—"City in a Garden." (Fig. 6) The entire Chicago lakefront has by law remained open and free for public recreation. The Chicago Park District, which owns the property where the Adler

sits, boasts over 30 square kilometers of parkland with 552 parks, 33 beaches, two world-class conservatories, 16 historic lagoons, ten bird and wildlife gardens, and many facilities for sports including baseball, basketball, boating, fishing, golf, skating, swimming, tennis, and volleyball. Beyond the city limits, the entire Great Lakes region offers bluffs, dunes, forests, prairies, ravines, shores, and countless other natural environments for exploration.

At each summer solstice, from the center of Adler's outdoor sculpture "Americas' Courtyard," one can peer down a channel made of stone and view the Sun setting behind one of the world's tallest buildings. The Adler would welcome the opportunity to give the world's planetarians a chance to view this sight for themselves, and greet the 2008 summer solstice in Chicago. (Fig. 7) ☆



Fig. 7: Eastern exterior of Sky Pavilion, nighttime; Courtesy Adler Planetarium Photographer Craig Stillwell.

Invitation to Oakland: IPS 2008

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Introduction

Chabot Space & Science Center in Oakland, California, USA, would like to invite the International Planetarium Society and its affiliates to consider us as the host for IPS 2008 around the dates July 20th to 24th. The two main facilities that would host the conference activities would be Chabot Space & Science Center and the **Oakland Marriott City Center**.

Chabot, with its two large capacity domes (210 and 240 seats), and its links to many other similar facilities in the Bay Area and



California, provides an exciting opportunity for planetarians to meet, confer, network and innovate. The Bay Area is a fabulous destination with many astronomy, space and media-related attractions. We are delighted to have the support of the **Griffith Observa-**

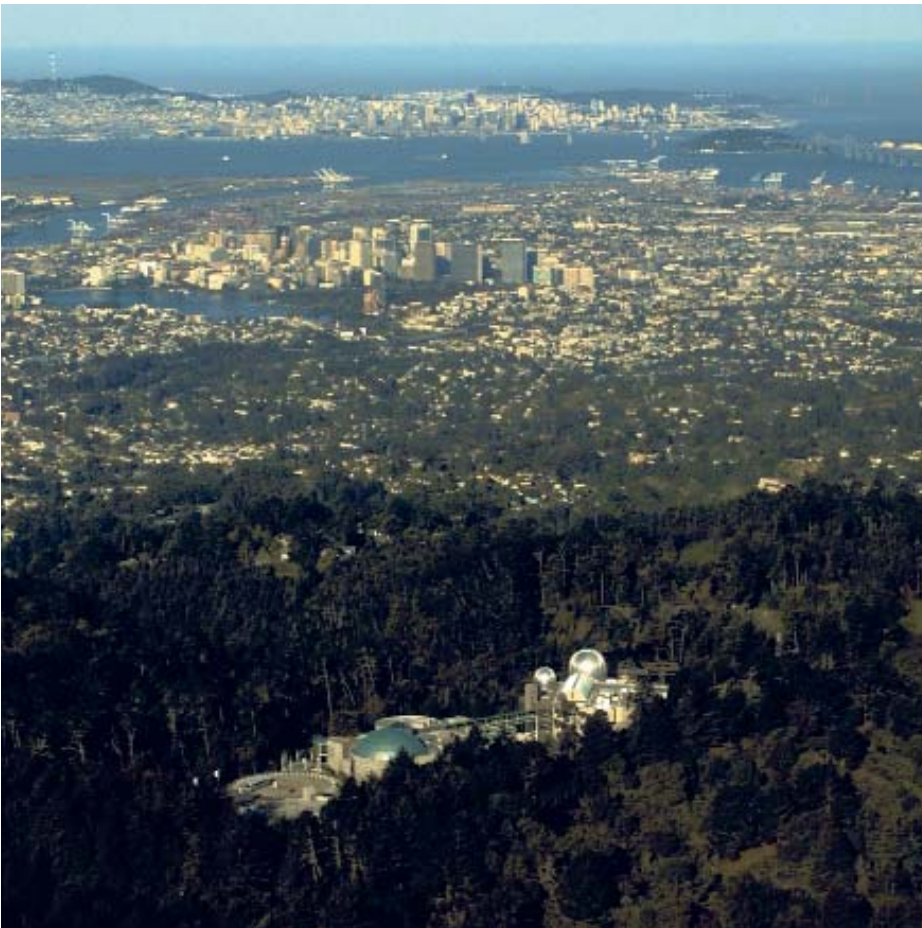
tory, California Academy of Sciences, Lawrence Hall of Science, and facilities such as the **SETI Institute** in bringing our colleagues to the Bay and giving them a conference to remember.

The next few years will see a great deal of change in the planetarium field. The different needs of traditional teaching planetaria, small domes, portable domes, large domes and those with digital projection technology need to be addressed and it is a tall order to do so in one facility and conference! We would like to suggest a conference theme *Immersive Space* to reflect the fact that even though our members and friends use their domes in many ways, they all create immersive experiences.

Oakland and Getting There

Oakland itself is an unknown jewel - The Other City by the Bay. Our partners include the **Oakland Convention and Visitors Bureau** who would handle a great deal of the administration and organization under our direction. They are experienced conference planners and organizers, giving confidence to the IPS membership that we can deliver a program in a cost-effective and efficient manner. The Oakland Marriott City Center can cope if the conference draws several times the suggested attendance. The Marriott, and the many other hotels located nearby, are in the vibrant downtown center of Oakland, with easy access to shops, restaurants, museums, gondola rides on the lake and a ferry to San Francisco!

Oakland is served with an International Airport (OAK), a short taxi ride away from the City Center. A shuttle connects the airport to the BART (Bay Area Rapid Transit) line and the hotel is outside the 12th St. BART station. San Francisco International Airport (SFO) is about 45 minutes drive from Oakland City Center, and is also served by a BART station. It takes about an hour to get from SFO to the Marriott by BART. The hotels are less than three kilometers from the nearest Amtrak Station (Oakland, Jack London Square). SFO is a major tourist airport



Chabot_air300.jpg - Courtesy Chabot Space & Science Center. Photo by Dan Miller.

This is the second of two articles that invite the membership to choose a conference venue for 2008.



Courtesy Chabot Space & Science Center. Photo by Carter Roberts.

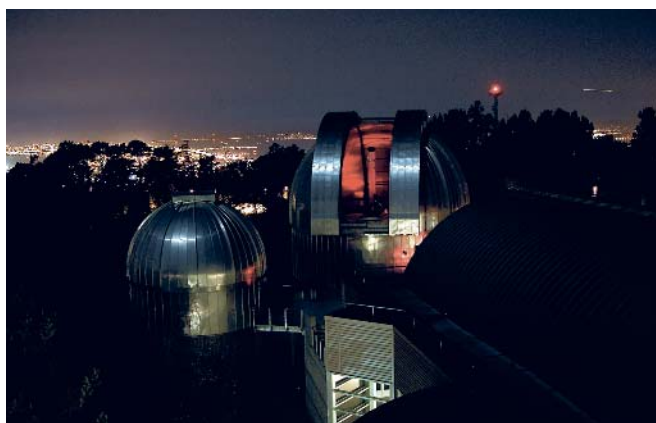
and often attracts bargain fares from International departure points. Due to the good public transportation, it will be possible to attend this conference without renting a car, cutting down on costs to participants.

Chabot Space & Science Center

Originally established in 1883, Chabot Space & Science Center has a stellar record of using space and astronomy to inspire visitors of all ages. In our new facility, which is set in 5-1/4 hectares of Redwood forest and opened in 2000, we have exhibits, classrooms, labs, outdoor spaces, meeting rooms and both a planetarium and movie theater.

For the dome demonstrations and any day and evening sessions, coaches will be laid on from the Marriott downtown to our 450-meter hilltop location. If attendance is higher than the two domes can handle at one sitting (450), evening sessions will be staggered to allow for eating, demonstration and travel times.

Chabot Space & Science Center has two domed theaters. Our 21-meter planetarium dome has 240 seats, a Zeiss VIII Universarium, SEOS full dome projection system running Digital Sky and the usual assorted con-



Courtesy Chabot Space & Science Center. Photo by Carter Robert.

trol systems. Our 18-meter Megadome has 210 seats. It is equipped with an 8:70 film system, 35mm system and high definition projection, and can be outfitted with full dome projection for demos. This gives us the capacity to run demos for up to 450 participants at one time and to run different types of programs. We are not open 7 days a week, so we will be able to hold some workshops and demonstra-

tions in the domes during the daytime, avoiding the very late nights that sometimes have been needed at other venues.

Accommodations, Conference Facilities, and Costs

The Oakland Marriott City Center / Oakland Convention Center has a large number of flexible meeting rooms, banquet rooms, lounges etc accommodating up to 700 people sitting for banquets. About 20 rooms are available for parallel sessions, breakout groups, and meetings, seating from 30 to 1000. This allows us great flexibility when planning the schedule. A reasonable amount of meeting equipment, including all sound needs, (tables, chairs, easels, boards etc) is provided free of charge. Our current cost summary (2005 estimate based on sharing a room) is; registration estimate \$400; Room costs for five nights allow \$400; Allowance for expenses not covered by conference \$150; Banquet ticket target cost \$45; Total before flights = \$945.

Our partner, the Lawrence Hall of Science, has an international reputation for their live, hands-on programs. Working with the LHS, we propose at least one day of specific sessions held at the LHS, tailored for smaller teaching domes.

Why should I support Chabot Space & Science Center's bid?

One answer - Flexibility. Our planetarium

profession is changing rapidly as technology moves forward. There are differences in the conference needs of big domes, digital domes, small domes, teaching domes, portable domes, etc. Different issues affect these various groups, and they are interested in related but varying topics and themes.

What if I am a ... Small Teaching Dome or Portable Planetarium?

There is space at our proposed conference venue, the Oakland Marriott City Center, to set up several portable domes in order to conduct sessions using a variety of old and new projector types. We are also proposing

sessions on production for small digital domes, and some maintenance sessions.



Courtesy Chabot Space & Science Center. Photo by Conrad Jung.

Older mid-sized or large dome?

Do you use slides and home made special effects? Have just a single video projector? We will not be forgetting more traditional show production and issues that you face, and will have special sessions for the maintenance and marketing issues for traditional domes. We are also proposing a forum to discuss the pros and cons of changing to digital systems, and some fundraising ideas.

Mid- to large-sized digital dome?

Have we got a conference for you! Chabot is situated among some of the premier animation and gaming houses in the world - Pixar, LucasArts, Dreamworks, Electronic Arts, etc. We intend to explore all the ways in which a digital dome can be used, from teaching to entertainment.

DomeFest, the independent 'film' festival

to encourage art and innovation in full-dome production, will move from **Lodestar Planetarium** in Albuquerque to Chabot Space & Science Center for 2008 if we are successful with our bid. DomeFest includes people involved in full-dome gaming and entertainment as well as music and art, enabling attendees to see all this medium has to offer.

Potential Exhibitor?

The Convention Center has ample space and 6.7-meter ceiling height. Chabot Space & Science Center is committed to driving traffic and awareness for our exhibitors. We are proposing to have several public events/demos/lectures within the exhibit space, and are looking at the logistics of having an exhibition-only ticket on one day to increase traffic. But what makes us think that the public would be interested? Recently San Francisco hosted NextFest, from *Wired Magazine*. Although most of the sellout crowds were not able to buy a personal helicopter or VR system, there was great appeal in being able to try things out, see things, and experiment.

The addition of DomeFest to this conference will attract additional Bay Area technology and animation professionals/companies giving an added buzz and dimension to the trade show. For example, who knows where full-dome gaming will be in 2008? What sort of interactive systems might be available?

In addition, we will use our press contacts, such as *Wired Magazine*, and our University, media, and education contacts to insure that we reach into many different communities who could be interested in attending the exhibition to investigate the technologies.

This strategy will insure not only a vibrant and active exhibition for IPS attendees, but could generate some additional revenues to help offset the costs of attendance.

Activities before, during and after the conference.

Many fun activities are possible due to the creativity of our partners.

- * An afternoon and evening in San Francisco hosted by the Morrison Planetarium at the California Academy of Sciences. They are expecting to be just open, or close to re-opening in 2008!
- * A pre- or post-conference tour in Southern California, hosted by the Griffith Observatory, (reopening in 2006) and including astronomical sites such as JPL and Mount Wilson. May also include Mojave if it really is a thriving Space-Port by then!
- * A day in the South Bay hosted by the SETI Institute, and including NASA Ames and some of the smaller domes. The SETI Institute is also proposing a pre- or post-conference visit to the Allen

Telescope Array at Hat Creek with a detour through the wine country.

- * Along with the DomeFest attendees, we are planning to organize a tour of Pixar and other Bay Area animation houses such as LucasArts or Dreamworks.

In addition, if the sky is clear following the demos each evening, Chabot's large telescopes (20-cm and 51-cm refractors, 91-cm reflector) will be available for viewing. Walking tours of the sights of Oakland will be available and attending spouses and families will be given a package with free and money off passes to local science centers and attractions.

A Possible Conference Program

Balancing the needs of a very full conference agenda with the need to allow time for networking, Chabot Space & Science Center is considering extending the conference by making more use of the 'weekend before'. This time is really ideal for business meetings and networking.

Many people don't arrive until the last minute given that traditionally the business meeting has been on the first morning, and some consider that 'missable'. Air fares however are usually cheaper if a Saturday night stay is included. All of the IPS Committees and informal special interest groups will be encouraged to 'come early' and meet. DomeFest, and the suggested public exhibition day with lectures and activities should also provide some incentive.

Please note this is very speculative at this



Courtesy the Oakland Convention & Visitors Bureau. Photo by Barry Muniz.

point and feedback and ideas (via the website below) are welcomed.

Saturday

- * PS Council Meeting, Exhibition set up, Registration opens (pm)
- * DomeFest jury meetings and discussion sessions
- * Facilitated networking dinners at various restaurants for different groups (we'll just book tables and organize getting people together! Participants pay for their food)
- * DomeFest screenings at Chabot

Sunday

- * Registration, IPS Council Meeting
- * Public Exhibition Day and activities
- * Opportunities for special interest groups (such as full-dome standards, or Digistar Users Group etc) and IPS Committees to meet
- * Happy hour' with the exhibitors, followed by evening welcome reception with special guests.

Monday

- * Registration, Opening breakfast and ceremony, IPS Business Meeting
- * Papers, workshops, panels, exhibition and posters (all day)
- * Breaks and Lunch in the exhibition area
- * Portable dome sessions (afternoon)
- * Vendor or workshop/paper sessions that require a bigger dome at Chabot (afternoon)
- * Dinner at Chabot, Vendor demonstrations (evening)

Tuesday

- * Papers, workshops, panels, exhibition and posters (all day)
- * Breaks and lunch in the exhibition
- * Live, teaching dome sessions at LHS (special one day of activities)
- * Possible afternoon dome sessions at Chabot
- * Dinner at Chabot, Vendor demonstrations (evening)

Wednesday

- * Papers, workshops, panels, exhibition and posters (until midday)
- * Portable dome sessions
- * Breaks and lunch at conference, last chance to see exhibition.
- * Free afternoon and evening
 - o Afternoon/Evening in San Francisco with Morrison Planetarium (option)
 - o Animation tours (option)
 - o South Bay SETI and NASA tour (option)

Post conference activities begin

More details on the Chabot Space & Science Center bid, including possible conference programs and an online discussion area to give your feedback can be found at our bid website www.ips2008.org.

We look forward to seeing you!



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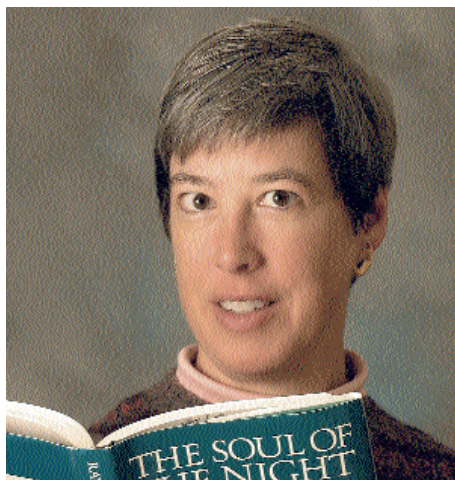
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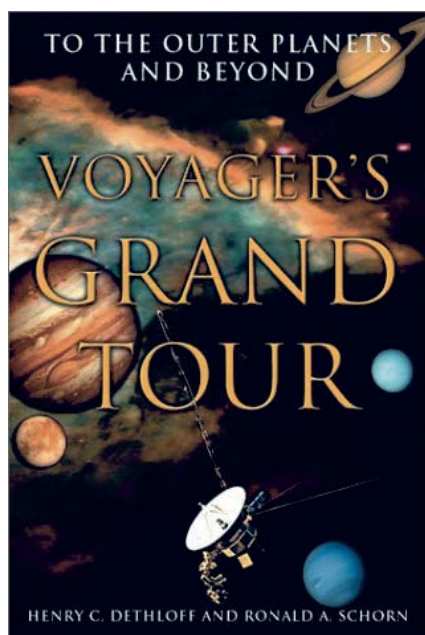
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Big Universe Easy Access

Reviews



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It's the outer limits this quarter, gentle readers. Our loyal reviewers bring their expertise from Earth orbit to the edges of the Universe. Best wishes for a peaceful solstice, and many thanks to our excellent reviewers: Chris DePree, John Potts, and Steve Tidey.



***Voyager's Grand Tour: To
The Outer Planets and
Beyond***

Henry C. Dethloff and Ronald A. Schorn, Smithsonian Books, Smithsonian Institution Press, Marketing Department, 470 L'Enfant Plaza, Suite 7100, Washington, D.C., 20560, 2003, ISBN 1-58834-124-0, US\$ 29.95

Reviewed by John Potts, The New Detroit Science Center, Detroit, Michigan, USA.

The Voyager mission is a result of many factors being brought together under some very special circumstances. A rare alignment of the Earth and outer planets, a visionary team, and many technical breakthroughs all contributed to a mission that changed our view of our neighborhood in space. The history of the Voyager mission is traced back to the 1960s. During this time, a "Grand Tour" of the outer planets was viewed as impractical. A journey to Neptune would take 30 years using the technology of the time. It is hard to imagine a mechanical device operating flawlessly for over 30 years without any maintenance. As technology advanced, the Voyager missions became possible.

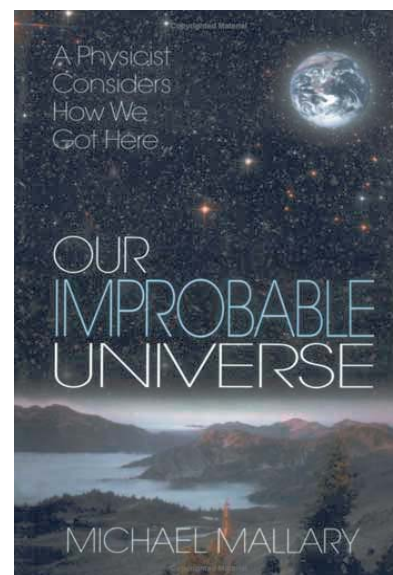
A rare alignment of the Earth and outer planets, a visionary team and many technical breakthroughs all contributed to a mission that changed our view of our neighborhood in space.

In this book we get a behind-the-scenes view of the Voyager project. All the facets of one of NASA's most complex mission are detailed, including many of the administrative, political and technical issues. Unfortunately the book gets tedious by the amount of details covering the political and budgetary aspects. The astronomical and technological breakthroughs that made the Voyager missions possible are treated as secondary to the administrative maneuverings that seem to prevail in any large governmental organization. This book follows the many incarnations of the "Grand Tour" mission as it is canceled in one program, and reappears as another. Advances in technology and changes in the national political arena made the mission possible. The "Grand Tour" mission was finally named "Voyager", and a legendary mission was born.

It was not an easy birth. In the first half of the twentieth century, planetary astronomy was considered only a secondary field of interest or study. In a 1944 article in the journal *Reviews of Modern Physics*, Nicholas T. Bobrovnikoff stated, "The identification of methane and ammonia in the atmosphere of the major planets and of carbon dioxide in

the atmosphere of Venus appears to have solved the planetary problem in its entirety." Sadly this attitude was prevalent at NASA. The authors state, "Decades later, after the initiation of NASA space programs, similar attitudes among a wide variety of "distinguished senior scientists" discouraged planetary research in general, and deterred investment in expensive space probes to the outer planets" (pg. 150). It is amazing that the Voyager mission succeeded while faced with such attitudes.

Voyager's Grand Tour includes eight pages of color photos and many black and white photos and diagrams. The images that the Voyagers sent back are still stunning today. I find it reassuring that Voyager I and II are still traveling the cosmos, looking for edge of our solar system, the place where the solar and interstellar winds meet.



Our Improbable Universe

Michael Mallery, Thunder's Mouth Press, 245 West 17th Street, 11th Floor, New York, New York, 10011, 2004, ISBN 1-56858-301-X US\$ 26.00

Reviewed by Chris De Pree, Associate Professor of Physics & Astronomy, Agnes Scott College, Decatur, Georgia, USA.

Since the time of Galileo, most scientists have stuck to observing and modeling the physical world, and let the philosophers and theologians talk about *why* things are the way they are. But in recent years, scientists — a large fraction of them physicists — have more openly taken on topics along the frontier of science and religion. In a lecture at Agnes Scott College in Decatur, Georgia several years ago, Sir John Polkinghorne (English particle physicist turned Anglican priest) described the "battlefront" between science

and religion as having zones with differing levels of strife, with some areas of open conflict (biology) and other areas of relative calm (physics).

As an indication of their level of involvement along the frontier between science and religion, physicists and astrophysicists have won a disproportionate share of Templeton Prize awards in recent years. This prize is given annually to an individual who is credited with the "creation of new structures of understanding the relationship of the Creator to his ongoing creation of the universe." While the prize is open to all disciplines, close to half of the winners of the Templeton prize since 1987 are physicists or astronomers. In fact, Sir John Polkinghorne won the prize in 2002.

Michael Mallary is yet another physicist

Michael Mallary is yet another physicist who does not shy away from the frontier between religion and science, and in his new book *Our Improbable Universe*, he takes on the philosophical implications of the uniqueness of our universe

who does not shy away from the frontier between religion and science, and in his new book *Our Improbable Universe*, he takes on the philosophical implications of the uniqueness of our universe. His arguments are an extrapolation of an idea called the *anthropic principle*. The idea is basically this: the universe is the way it is because, if it were different, we would not be here to observe it.

Mallary's book begins with an interesting premise: whether the universe was designed, or came into being randomly is not the most important issue. Mallary states that whatever its origin, our universe is highly improbable, and for that reason, we are obliged to be good stewards of it. The book opens with an explanation of just how finely tuned this universe of ours appears to be, describing what Mallary calls the fourteen stepping stones required for our existence as observers. His stepping stones span particle physics (CP Asymmetry), nuclear physics (mass of neutrons), and astronomy (stellar evolution and supernovae). The first five chapters then expand on the details and quirks of physics that make life in the universe (us) possible, and this part of the book is quite clear and readable, with helpful diagrams.

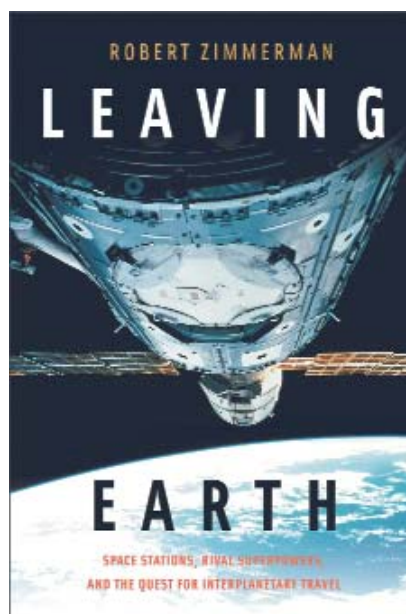
The book is divided into thirds, with the first third devoted to physics, the second

third to the origin and evolution of life, and the final third to speculation about other life in the universe, and the possible signature of a creator. Since the book is written by a physicist, it is not surprising that the first part is the strongest of the three. The final third of the book contains interesting philosophical speculation about the implications of an improbable universe, but the narrative seems to lose direction in the later chapters, in particular in Chapter 13 ("Where is the Signature?"). Let me be clear, this is not a book that argues against evolution or any other well-established scientific theory, but its speculation about a creator in later chapters might make even physicists along the frontier with religion a bit uncomfortable.

Mallary makes a convincing case that the universe that we inhabit is highly improbable. In his introduction, Mallary states:

If the life-begetting substructure of our cosmos arose from a random process, then our fertile universe is a rare gem amongst an uncountable number of dead ones. If its physical laws were micro-engineered by a creator, the accomplishment is awe-inspiring. Either way, this incredible universe, and the life it has spawned, should be cherished.

When Mallary sticks to this message in the book, he is most successful. His descriptions of the science are clear and entertaining, and his style is engaging throughout. But when the book meanders into suggestions for the signature of a creator in the universe, the arguments lose their clarity. This may be the book you'll need for answering questions after a planetarium show, or to browse through some evening when the clouds have pre-empted the observatory program. Check it out.



Leaving Earth: Space Stations, Rival Superpowers, And The Quest For Interplanetary Travel

Robert Zimmerman, Joseph Henry Press, 500 Fifth Street, NW, Washington, DC 20001, USA, 2003, ISBN 0309085489, US\$27.95.

Reviewed by Steve Tidey, Southend, Essex, England.

If you buy this book (as I recommend you do) prepare for your flabber to be gasted by many jaw-dropping revelations of behind the scenes arguments, petty rivalries, near calamities in orbit, mutinous behaviour, truth-bending, outright lies, political shenanigans and occasional dumb luck that has characterized the hidden aspect of the American and (this book's main focus) the Russian space programme. But on the other hand, you'll also get a new appreciation for the immense skill, dedication and heroism that made possible all those historic moments we cherish.

Zimmerman's book follows in the admirable wake of others such as *Red Star In Orbit*, *Dragonfly* and *Korolev*, which in their own ways blew the lid off the cozy public relations gloss that NASA and the Russian Space Agency have applied to their respective programs, to show instead the real human drama behind the headlines. Zimmerman repeats some of those amazing stories (which is OK; they deserve repeating) but he also brings us up to date with the more recent flights since *Red Star* was published in 1980, and he finishes with the Shuttle-Mir program.

So there are plenty of new anecdotes here (at least they were new to me) to keep the reader goggle-eyed and keen to turn the page. It really does read like a pot-boiler at times. Indeed, there's enough material to write several planetarium shows entitled, *Things You Weren't Supposed To Know About The Russian And American Space Programs - But Do Now*, or you could cherry pick from the many anecdotes and slot them into your answers to generic questions from the public at the end of a planetarium show. Or you can just read the book and think, "They did what? They said WHAT?"

A few of the lighter moments occur when we learn that when Norm Thaggard landed in Florida on the space shuttle with two returning Russian cosmonauts from *Mir*, NASA had to urgently apply to the Immigration and Naturalization Service for a special 'visa waiver for aliens from outer space' because the Russians didn't have passports; and in 1991 when Britain's Helen Sharman spent 10 days aboard *Soyuz*, on her second night there she put on a frilly jumpsuit for dinner

and one of the cosmonauts in turn put on a formal tie that, of course, floated.

In *Leaving Earth*, Zimmerman uses a nice technique that he put to good use in an earlier book, *Genesis: The Story of Apollo 8*, in which he draws direct correlations between political developments on Earth and events in space that either came about as a result of those machinations, or which quickly shaped them. This pushes the space race into the realms of sociology, which is a common thread throughout the book.

So there are plenty of new anecdotes here (at least they were new to me) to keep the reader goggle-eyed and keen to turn the page. It really does read like a pot-boiler at times. Indeed, there's enough material to write several planetarium shows ...

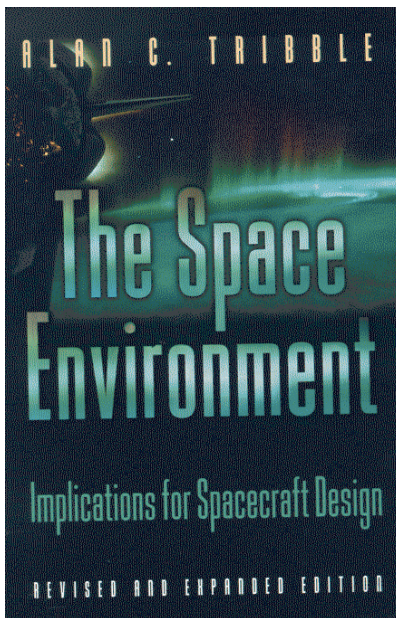
For me the end result of all these insights is that I have an even greater admiration for the people involved in space programs over the last 50 years than I had before, when I think of all the obstacles (some self-imposed) they've had to overcome to achieve the remarkable things they've done. Yes, the result of Zimmerman's meticulous research doesn't always show humanity in a favorable light, but in the end the indomitable human spirit does shine through. And with the recent discovery of the diaries of the late Vasily Mishin (Korolev's rival Soviet rocket developer in the 50s and 60s) we can expect more books like this, which I welcome; the world's a cynical enough place these days that we don't necessarily think less of space scientists and astronauts after we've had the chance to examine their warts and weaknesses. It just makes them look all the more like the rest of the world, which is somehow comforting.

The Space Environment: Implications for Spacecraft Design

Alan C. Tribble Princeton University Press, 41 William Street, Princeton, New Jersey, 08540, USA, 2003, ISBN 0-691-10299-6, US\$45.00, UK £29.95.

Reviewed by Steve Tidey, Southend, Essex, England.

I applaud Tribble for identifying a



space/astronomy topic that hasn't had much coverage over the years (that's getting increasingly hard to do, as space books are so common these days) but I just wish this book had been written on a more popular level. To be fair to the author, 190 equations and a few dozen technical diagrams spread over 232 pages means the book is exactly what it claims to be: a college level introduction to the physics of the space environment, which impact the design and construction of satellites and space probes so as to minimize damage and poor performance. But there are enough interesting tidbits of information in these pages to justify a different treatment for the common person, who isn't studying the subject as part of a degree.

... the book is exactly what it claims to be: a college level introduction to the physics of the space environment, which impact the design and construction of satellites and space probes so as to minimize damage and poor performance.

Still, if you stick with it this is a comprehensive treatment that covers a wealth of material. For instance, you'll learn about the design modifications needed to reduce adverse space environmental effects on spacecraft caused by things such as the degradation of electrical circuits from solar radiation, cosmic rays, etc., damage by ionised atoms in Earth's upper atmosphere, material erosion by atomic oxygen, electrical dis-

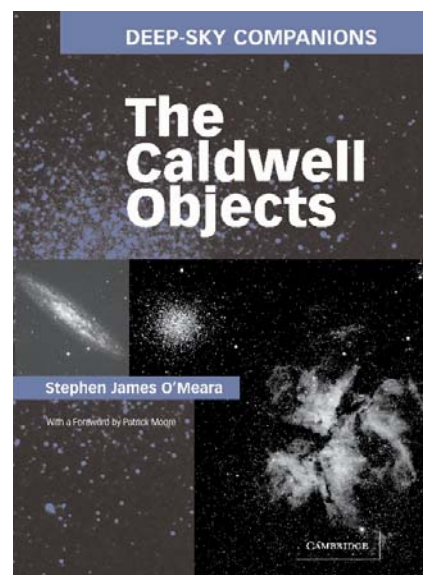
charges on spacecraft surfaces and the bombardment of micrometeorites, to name but a few.

On that last point, we learn that during STS-7, a fleck of orbiting paint struck a shuttle window causing a crater 0.2mm wide, which required \$50,000 of repair on the ground after the mission. Another wow factor is that a 3mm-wide piece of space junk orbiting at 10 km/s has the kinetic energy of a bowling ball moving at 100 km/hr.

The overall treatment is very academic (I suppose the fact that it's published by Princeton University is a bit of a giveaway there) with lots of references and bibliography notes at the end of each chapter, so readers may feel as though they're moving through a succession of papers in an academic physics journal. That's OK, as long as you don't open the book expecting something different.

So, all things considered, I'm deeply impressed with the depth of technical know-how spacecraft design engineers need to have to give their probes even a small hope of working for any length of time, given the harsh conditions out in space. It's all very well us telling the public it's not easy to design and build satellites, but a book like this really brings home the daunting task even to us planetarians who know a thing or two more about it than most people.

If you already have the physics knowledge to follow the equations you'll feel right at home with this book, and I imagine it'll be looked on as somewhat of a bible for people studying to become spacecraft engineers, but if you don't fall into either of those categories I'd wait until a more popular level version appears.



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Audience viewing Infinity Express aboard Queen Mary 2 Illuminations Planetarium. Photo by Gareth Akenurst



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Stephen James O'Meara, Sky Publishing Corporation, Cambridge, Massachusetts, 02138-1200 USA and Cambridge University Press, The Edinburgh Building, Cambridge, CB2 2RU, UK; 2002, ISBN 0-933346-97-2 and 0-521-82796-5, US\$39.95, UK£25.00.

Reviewed by Karl von Ahnen, Minolta Planetarium, De Anza College, Cupertino, California, USA.

Deep sky observers now have a list of 109 "C" objects to go along with the popular 109 "M" objects. "M" objects are those galaxies, star clusters and nebulae, listed by the 18th century French comet hunter Charles Messier. This was Messier's list of 'nuisance' objects that might be mistaken for a comet. Although this list is now used as a guide to some of the most beautiful objects in the night sky, this was not its original intention. And it is incomplete in this regard.

World famous astronomy popularizer, Sir Patrick Moore (as in Patrick Alfred Caldwell-Moore) decided to help rectify this situation by creating a new list of objects to supplement Messier's list. Stephen James O'Meara has now written the definitive guide to these objects.

The book includes a forward by Moore,

Stephen James O'Meara is one of the leading observers of our time.

then a preface and acknowledgments. The first chapter tells about the book - its making, and how to use it. The second chapter is the meat of the book, where the Caldwell objects are described one by one. The third chapter lists 20 more objects O'Meara thought should be included - it is his book! Perhaps we should call these the "O" objects. There are a number of appendices, both interesting and useful.

Stephen James O'Meara is one of the leading observers of our time. His keen eye, amazing patience, and undying enthusiasm for the night sky have come together in a captivating presentation of Moore's list. Moore mentions in the forward that he wanted to include some challenging objects. I can testify that he has succeeded. After viewing some of the objects through a 25 cm (10 inch) telescope under pristine skies, I can state that these are not all easy objects.

Stephen O'Meara has performed magic at the eyepiece of his 10 cm (4 inch) scope! He describes the appearance of the objects in amazing detail. In the three or four page sec-

tion on each object, O'Meara also includes a drawing made at the eyepiece, a photo, a finder chart, and written directions for finding the object.

My favorite part of the book? The special points of interest O'Meara includes for each object. There's some history, a description of the physics involved and often some personal story. He also includes descriptions from other observers and often describes near-by objects one might want to look in on while in the neighborhood.

Time will tell if Sir Patrick Moore's list will catch on to the degree that Messier's list has, but with this book, there's a new list of objects that observers can enjoy reading about and viewing on the next clear night.

This is the second in O'Meara's 'Deep Sky Observer's' series. The first covers the Messier Objects. I'm anxious to see what comes next. I think this series will long survive as a great set of observing books. I can't help but be reminded of the landmark three volume set of Burnham's Celestial Handbook.

This would be a good book to have in your gift shop especially if you are visited regularly by amateur astronomers. It would also be useful as a reference book in your library or definitely as an observing guide at the observatory for star parties. ☆

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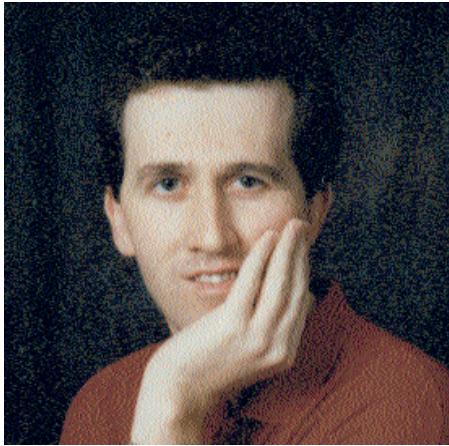
STAR SKY SHOW

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The Halloween Show



Steve Tidey

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stidey@sabreshockey.com**

(The Forum column has a one-off guest editor for this issue – Homer Simpson)

Hello, I'm Homer Simpson. Well, somebody has to be.

So, you guys are into astronomy, eh? Hmmmm, foood. Mars bars, Milky Way, Galaxy. Hey, I love space! Why, Jupiter's the same size and shape as my stomach. I kinda like Neptune, too. He was that guy who lived in the ocean, right? So why didn't they call the planet Jacques Cousteau?

I looked at Pluto the other night. Doesn't look anything like a dog. Somebody sold me a Mickey Mouse telescope!

When I was in England last year with Marge and the family, the British Prime Meridian Minister, Tony Blair, met me at the airport and asked me on Steve's behalf to write the Forum column for him just this one time. Fortunately, they've got the Internet on computers now (what will they think of next?) so I emailed Steve the column after I wiped off the jam doughnut stains.

Hey, can you folks in the IPS clear something up for me? I keep hearing about a man in the Moon, but I thought we brought them all back to Earth. Am I missing something here? And what's with the Moon going round and round the Earth all the time? Are we being watched? Grrrr, those pesky aliens!

Do you guys have any pull with NASA? Could you ask them to send out astronauts to bring home those millions of pizzas that are lying around on Io? Doh, I'm hungry now!

Hey, I'm trying to think of a way to turn the white dome of the Capitol building in

Washington into a planetarium. But I can't think of a way to get a huge killer whale through the front door. Any ideas?

Steve tells me that in the last issue he asked for contributions on this subject:

How realistic is President Bush's new Space Initiative? Will astronaut safety issues hold NASA back from achieving the initiative's stated goals of establishing a base on the Moon and Mars, or will it forge ahead and view this as its new reason for being, for which the Agency has been searching these last few decades?

So let's run that up the flagpole and see who salutes it first. Oooh, it's Steve Fentress. While you read the contributions I'm going off to have an argument with my brain.

I am writing this the day after hearing Astronaut Pamela Melroy speak at the Rochester Institute of Technology. With no prompting from me, she mentioned astronaut safety issues, including radiation and re-adaptation to gravity after long weightlessness, as serious challenges facing any plan for human travel beyond the Moon. She also said, "The opinion of the Astronaut Office has not changed from what it was before Columbia - human space flight is not safe. It is an inherently risky endeavour." But she made it clear that she believes it's worth doing.

How many more Columbia-like disasters will the American public accept and still support human space flight? That may depend on whether people can place the setbacks in the context of a bold forward purpose. There was such a purpose in the 1960s. JFK was willing to "wreck the budget" for Apollo. NASA Administrator James Webb saw the Moon program as an endeavour that would stretch and expand the country's entire industrial and educational infrastructure. Each new flight represented a dramatic, high-risk advance.

Compare today. President Bush announced his "Vision for Space Exploration" on January 14, 2004. A week later, in an hour-long State of the Union address, he did not mention it, though he did mention such matters as steroid use among professional athletes setting a bad example for children. Nor did he mention the Vision in his State of the Union Address this year.

President Bush did appoint a commission to examine and make recommendations on implementation of his Vision. The resulting report says that the Vision would have to be managed as a significant national priority over multiple administrations, that many

aspects of NASA would have to be decisively transformed, and that a robust U.S. space industry and international cooperation would be required. It concludes, "the Commission unanimously endorses this ambitious but thoroughly achievable goal."

As of this writing, the Vision is still only a proposal. Congressman Sherwood Boehlert (R-NY), Chairman of the Science Committee of the House of Representatives (and thus arguably the single individual with the greatest power over the NASA budget) said in a hearing in February, "I think it's critical that Congress have a full and open debate on the President's Vision for Space Exploration and the future of NASA before NASA barrels ahead with the program. Congress has never endorsed - in fact, has never discussed - the Vision ... I am for a NASA that sees itself as a science agency, with all of Space Science, Earth Science and Aeronautics receiving the funding accorded to priority areas There are a lot of fundamental questions that NASA still isn't ready to answer. That's not a criticism of the agency. That's just a description of where they are in the planning process."

So, until the Congress gets the information it wants and thoroughly debates the President's Vision, we can ask not only, "How realistic is it?" but also, "How real is it?"

Steve Fentress, Director
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Will American astronauts go back to the Moon within the next twenty years? Despite the huge cost, I am sure that, somehow, Congress will make sure Americans return to the Moon before the Chinese and other foreign powers reach the Moon. Yes, we have another "Space Race."

Will American astronauts reach Mars within a decade or two thereafter? Considering the price tag of such a mission, I doubt it. The official line will be that there are "delays." In reality, without pressure from a "Space Race" to Mars (as no other power could afford to even think about sending people to Mars), Congress will not be willing to provide the additional funding necessary for such a mission anytime in the foreseeable future.

Having the future of space exploration depend on political "space races" is not the way for mankind to reach out into outer space. And the costs of the current NASA initiative, including the shutting-down of the Hubble Space Telescope and the Voyager missions to the edge of the Solar System, are pennywise and pound-foolish!

NASA has had many successes over the

last 45 years - and some setbacks, as all human endeavours experience setbacks, from time to time. However, no one nation, or even group of nations, can commit the amount of public resources to aggressively move mankind into space, as I believe needs to be done. This is particularly true in a pluralistic democracy, with many competing interests.

The very limited public funding available should be spent to maximize the benefits of the existing space infrastructure, including Hubble, Voyagers, and the International Space Station. The taxpayers have already made huge investments in this infrastructure. This infrastructure should not be cast aside or completely abandoned. Abandoning valuable infrastructure is not conservative, in the true definition of the word!

Mankind desperately needs to aggressively move into outer space, and not just for exploration. As the world population continues increasing, and resources to support that population continue dwindling, we need to find new resources, out there, to support the people on our planet.

I would also argue that the government should commit some resources to promote an aggressive, manned, commercial space program. Yes, this past-year's success of SpaceShipOne, and the prospect of a Space Tourism industry, is a good first step. But, we need to go much farther than space tourism.

In the mid-nineteenth century, when Congress wanted to develop the American West, they enacted specific incentives to such development: Railroad Land Grant Act of 1850 and the Homestead Act of 1862. To make similar incentives for outer space development will probably require the amending, or complete rewriting, of the Outer Space Treaty of 1967 (which is vague on commercial space activities). Without a new or amended space treaty designed for the needs of the twenty-first century, which provides for property rights on celestial bodies, outer space development will continue to lag.

And, a successful, aggressive, manned, commercial space program would actually *increase* scientific access to outer space. So long as there is a government near-monopoly on manned space exploration, the costs of manned scientific exploration of space will remain high, and a government bureaucracy will decide which scientists go into space and which cannot.

With a successful, aggressive, manned commercial space program, over time the price for human access to space will come down. And, eventually, even planetarians will be able to afford to go into space (and I do not mean just a sub-orbital tourist flight), and perhaps even conduct their own independent research in space!

Glenn A. Walsh
Planetarium Lecturer 1988-1991
original Buhl Planetarium
Pittsburgh, Pennsylvania, USA.

As exciting as human exploration of Mars and colonizing the Moon would be, and as beneficial as these adventures would be for the planetarium field and science education in general, I don't think this is very realistic at this time. In my opinion, this program is a bit too ambitious for today's economy and the present general mood of people. NASA is struggling to recover from the Columbia disaster, and is very gun-shy. Even the nearly routine servicing of the Hubble seems way too scary. How can a trip to Mars fit with this mentality?

The diverting of resources from other scientifically important programs to pay for this initiative is a big concern. For instance plans were just announced to withdraw funding for the continued monitoring of the two Voyager spacecraft, just as they are nearing the heliopause. And letting the Hubble die would be a scientific tragedy.

The thrill of space travel and exploration would be a very useful diversion from our worldly concerns and a great way to get people thinking in a more global, scientific and humanistic way. Alas, I don't think we can expect anything quite this big just yet.

Karl von Ahnen
Minolta Planetarium, De Anza College
21250 Stevens Creek Boulevard
Cupertino, California, 95014, USA

Recently, President Bush came out with the new space initiative; we are going back to the Moon and on to Mars. Is this something to really believe in? Can and will it really happen?

Well, before I give my two cents worth, let me say the following. I grew up with the glory days of space; Shepard, Glen, Gemini, Apollo, etc. I have, over the years, publicly, via TV, radio, and newspapers, strongly supported NASA and the space program. When Professor Gold at Cornell said that the Challenger astronauts were just a sacrifice for a NASA publicity stunt, I, on TV, voiced my disapproval of his opinion, and explained the value of manned space flight. I have, argued publicly with people that claim that the space program is a waste of money. So I am not anti-NASA.

However, I see no way that this new space initiative can work. And it will be NASA's own fault. The organization under O'Keefe, has lost all of its guts. Maybe the new person in charge will change this. But explain to me, how we can get to the Moon and to Mars, when NASA thinks that it is too dangerous

to service a telescope that is only a few hundred miles up in the sky? How can we ever progress, when we stop the program for more than two years when we have a disaster?

NASA must change their mindset. Exploration has always had its potential dangers. Columbus, Lewis and Clarke, the settlers that moved West, etc. Where would we be now, if they stopped for every death? I have also heard NASA spokesman say that we have to make it safe, because the public cannot handle another group of astronauts dying. Well, if the public can handle tens of thousands of people dying each year in automobiles, then they should handle a Shuttle disaster. And NASA should be able to handle public reaction. Cars, planes, and trains don't stop for two years every time someone dies. Shuttles shouldn't either.

The astronauts know the risks, and they are the ones willing to take them. In a 2003 article by former astronaut Walter Cunningham, he said, "There will always be risk associated with manned space flight. We should reduce the risk to a point where gain to be made exceeds the perceived risk and then get on with the job". Gus Grissom said, "If we die, we want people to accept it. We are in a risky business, and we hope that if anything happens to us, it does not delay the program. The conquest of space is worth the risk of life".

The day before I wrote this (April 5, 2005) Shuttle systems engineering Manager John Muratore said, "It is a risk that NASA and the nation must accept for flights to resume anytime soon". He added, "What NASA has to do to get smarter is to stop relying on computer models and start flying the Shuttles again".

And what about President Kennedy's May 25, 1961 speech, when he announced, "... landing a man on the Moon and returning him safely to the Earth"? Nowhere in his speech did he say that we would go only if it is absolutely safe. As a matter of fact he said: "... if we are to go only half way, or reduce our sights in the face of difficulty, in my judgment it would be better not to go at all".

We can redesign every square inch of the shuttle, and say its safe, but I can guarantee that we will lose astronauts in the future. We are dealing with millions of moving parts. We are pushing alloys, metals, and materials to, and past the limits of the laws of physics and chemistry. Then we attach it all to a tank filled with hydrogen and oxygen. And to top it all off, we put a group of humans on board this thing (who get a yearly salary that's actually less than what most of us make in the planetarium field) and launch it into space. What's wrong with this picture? Nothing! As long as you see the risks, and realize the value and knowledge to be gained by taking these risks.

So, can we get back to the Moon and go to Mars? I would hope so. It is something that I personally would love to see. But can we do it with the mindset that NASA currently has? I don't think so. And if anyone else does, well, there is a bridge for sale in Brooklyn, and you can name a star for yourself!

Steven LJ Russo
Planetarium Manager
Suits-Bueche Planetarium
Schenectady Museum
15 Nott Terrace Heights
Schenectady, New York 12308, USA

For myself I don't believe the promises of President Bush. I think, unfortunately, that the US Space Agency has become a tool in the hands of the President. I am not sure that the decision not to maintain the HST (while continuing to organize missions to ISS whose scientific benefits are much lower than HST's) will be the best choice for the development of fundamental astronomy. Perhaps my ideas are too sectarian? I would prefer that the missions of the Agency be focused on astronomy and not on industry.

Agnes Acker
On behalf of the Association of French
Speaking Planetariums

President Bush's Space Initiative is about as realistic as most initiatives from this administration. While the proposal itself has many fine concepts, it will go nowhere without adequate funding. Because of the large deficit, adequate funding will not be available in the foreseeable future. The only way NASA will be able to make any progress towards the goals outlined will be to gut other programs within the agency. This is one of the underlying factors in the decision to abandon the Hubble Space Telescope. Other science projects will be delayed or eliminated.

Bush is trying to sound presidential (in the style of JFK), but is unwilling to follow through with the resources necessary to accomplish the goal. It is more important to him to appear to be a visionary than to actually be a visionary. Bush's image is more that of Richard Nixon, who directed NASA to develop the Space Shuttle (with an unrealistic set of conflicting requirements) at the expense of many other endeavors NASA was prepared to embark on. This is why we have not been back to the Moon in nearly 35 years and why it will take another decade to get there, if then. Hopefully, the new Administrator of NASA will be able to form a coherent and achievable set of goals under the dire funding constraints forced on the country by Bush's excessive borrow-and-spend philosophy.

Safety issues are a problem for NASA. The problem, however, is primarily one of procedure. The most recent accident was caused by a piece of foam falling from the external tank. This had been observed on at least three earlier missions. Rather than test the consequences of a piece of foam hitting the orbiter at high speed when the anomaly was first observed, it was assumed that there was no real problem since the foam had a low density. Some engineers had expressed concerns early on, but testing their concerns would have been "too expensive". In reality, not testing those concerns was very much more expensive. Unfortunately, this is a mode of operation that evolves within an agency constantly under funded with respect to the scope of the mission it is expected to accomplish.

Dale A. Etheridge, Director
Community College of Southern Nevada
Planetarium
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Las Vegas, Nevada 89030, USA

I haven't the slightest idea whether NASA will actually establish bases on the Moon and Mars in the next few decades, as George Bush has proposed. It seems so difficult to tell what direction the United States is going on anything. Much depends on who the next President is, whether the US economy can recover from the current budget deficits, whether we experience more episodes like those of September 11, and whether other countries are able and willing to join us in space.

But should we? What could be the drawback of our sending humans to the Moon and Mars? I know you all can think of some.

- a) The opportunity cost. The economic cost. What won't we do if we go to the Moon and Mars? We won't spend that money, effort and commitment on other science – the next generation of space telescopes, the next generation of probes to the outer Solar System, medical research, agricultural research, etc. Not to mention feeding hungry children.
- b) The danger to the astronauts. If they die or end up stranded on Mars or in space, we'll all feel rotten.
- c) The environmental issue. We humans wreck every place we go. We're a pretty destructive lot. There may or may not be microbes on Mars, but we're sure to bang around in our usual sloppy way. And if there are microbes there, I worry for them.

The reasons to do it are easy:

- a) Science will be immeasurably advanced.
- b) Technological spin-offs will abound.
- c) The thought of our fellow humans

walking around on the Moon again and on Mars is thrilling - and I believe it will thrill the people of the world.

d) Our vision of the Universe and our lovely little world will expand exponentially, perhaps even more than the expanded vision we'll get from the most advanced space telescopes.

I believe that philosophical and spiritual insights - perhaps subtle, perhaps not - will result. These are unpredictable. I'm not aware that anyone predicted the stunning beauty of our planet from space that we first saw on our trips to the Moon. Those pictures have changed humans' view of our home world and our place in the Universe like nothing else could. I think of my college professor who, in 1970, after seeing *2001: A Space Odyssey*, exclaimed to his Renaissance Literature class, "It's out there that we'll meet God!" (Let's not argue about the word "God." He just meant God, or the meaning of life, or the meaning of the Universe or some such.)

I guess I think we should go to the Moon and Mars. But I think we should be infinitely more gentle and thoughtful than we are accustomed to being. Honestly, I wouldn't trust the current US government with that.

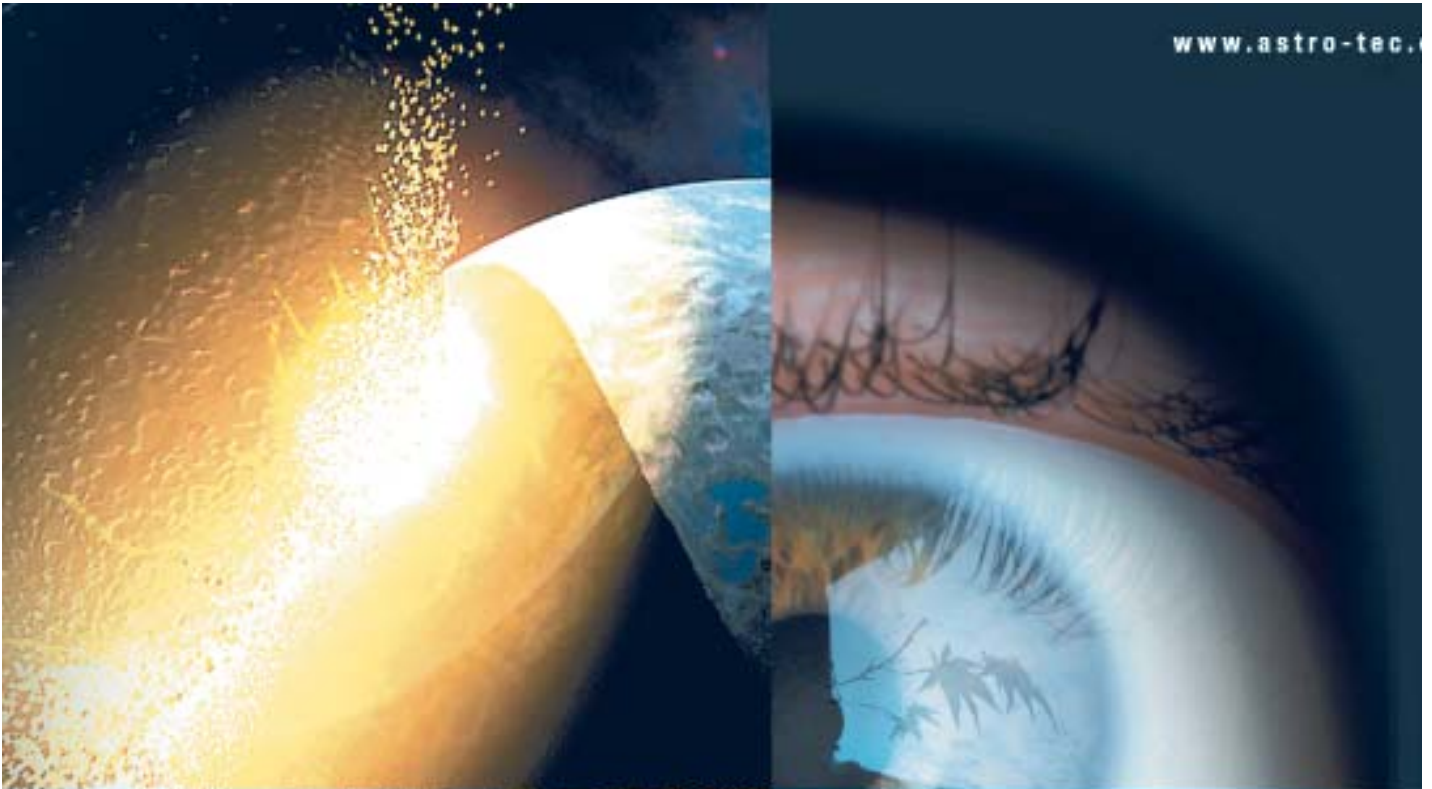
Robin Symonds
Director, Charles Hayden Planetarium
Museum of Science
1 Science Park
Boston, Massachusetts 02114, USA

Oh, are we done? Good, there's a baloney in the kitchen and it's calling my name! Come to Daddy!

Steve wants the next Forum topic to be: how can we persuade Jim Manning to come back and write more What's New? columns. Hey, does that mean you guys need a new sub-editor? Is there room in your journal for a food critic? But I threatened Steve with having to baby sit Bart for a day unless he asked you to reply to this:

We don't always like to admit it, but some planetarium shows are considerably better than others. So, in your eyes, and without mentioning specific shows adversely, what elements set the really good shows apart from the run of the mill?

Hey, whatever you do, don't send your contributions to me; I don't know how to turn my computer on. I always have to get Lisa to do it for me. Send them to Steve either by slug mail or over the Internet to his email address by July 9. Ooh, July 9, that's five days after Independence Day. I wonder if the rockets we set off last year have got to the Moon yet ... ☆



Planetarium photography courtesy of Kohn & Seward Computer Corporation.

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NASA Space Science News



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May you live in interesting times! I think we would all agree that we certainly do, made more so perhaps by the almost instantaneous global transmission of news - good, bad, or inane. Make that not just global news but Universal news. Thanks to NASA Public Affairs, all interested folks can now subscribe to receive NASA News Releases electronically. This should be a huge benefit to those of you who are on the front lines with live audiences nearly every day, as you can now get news from NASA directly, at the same time as the news media, before a reporter rewrites it as a sound bite or shortens it to fill 5 seconds before the weather spot. And you won't get caught flatfooted by your audience members who ask you about something they heard on the radio or TV before coming to your program, or worse yet, by your own local media looking for comments, because you'll already know! Subscribe to NASA News Releases at http://www.nasa.gov/news/newsroom/NF_SN_Subscribe.html.

If you already subscribe to NASA News Releases, then you were aware almost as soon as NASA employees that Dr. Michael Griffin was confirmed as NASA's 11th Administrator on April 13. Prior to his appointment, Griffin was serving as Space Department Head at

Johns Hopkins University Applied Physics Laboratory. Prior to that, he was President and Chief Operating Officer of In-Q-Tel, Inc. He also served in several positions within Orbital Sciences Corporation, including Chief Executive Officer of Magellan Systems, Inc. Earlier in his career, Griffin served as chief engineer and associate administrator for exploration at NASA Headquarters and also worked at NASA's Jet Propulsion Laboratory. He also served as Deputy for Technology at the Strategic Defense Initiative Organization.

In his confirmation hearing testimony to the U.S. Senate Commerce Committee, he affirmed that his priorities as Administrator, consistent with the President's Vision for Space Exploration, will be:

- ☆ Flying the Shuttle as safely as possible until its retirement, no later than 2010;
- ☆ Bringing a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement;
- ☆ Developing a balanced, overall program of science, exploration, and aeronautics at NASA, consistent with the redirection of the human spaceflight program to focus on exploration;
- ☆ Completing the International Space Station in a manner consistent with our international partner commitments and the needs of human exploration;
- ☆ Encouraging the pursuit of appropriate partnerships with the emerging commercial space sector;
- ☆ Establishing a lunar return program having the maximum possible utility for later missions to Mars and other destinations.

NASA TV is also undergoing changes. Transition of NASA TV from a single analog channel to multiple digital channels is nearing reality. A vendor for the primary components of the system was recently selected. For information, go to <http://www.nasadigitaltv.com>. Installation and checkout of equipment at the NASA Centers and NASA HQs is underway.

The NASA Public Service Channel will be encoded using the DVB standard. Any DVB compliant Integrated Receiver Decoder (IRD) will be able to receive and decode the new NASA Public Service Channel. (The three other NASA Digital Channels will be Education Services ("Free to Air"/"Addressable"), Media Services ("Addressable") and Mission Operations (Internal).)

("Free to Air" is a TV channel that local cable and satellite service providers are "free to air" at no cost. Your basic, commercial

"off-the-shelf" IRD can tune a "free to air" digital TV channel, provided you have a C-Band satellite-receiving dish.)

("Addressable" is a type of IRD that can not only receive "free to air" digital TV signals but also can receive and store specially-encrypted programming for rebroadcast. For technical specifications go to <http://www.nasadigitaltv.com>.

Once the digital channels go "live" in early May, NASA plans to continue providing the existing analog NTSC NASA TV channel in parallel with the new digital channels for at least 60 days to provide time for users to convert and confirm they are receiving digital NASA TV. The new digital channels will be on the same satellite as the analog channel (AMC 6), but on a different transponder (17).

For more about the new NASA TV Digital Channels, including the latest satellite information, conversion schedule updates and glossary of terms, log on <http://www.nasa.gov/ntv>.

NASA's websites are also changing. I encourage you to browse the NASA Education site <http://education.nasa.gov> as there is lots of buried treasure there. In particular, those of you interested in funding opportunities should look at <http://education.nasa.gov/divisions/eleandsec/grants>. You can also subscribe to receive e-mail notification of funding opportunities.

We are also pleased that two of our websites, the NASA Solar System site (<http://solarsystem.nasa.gov>) and the Cassini website (<http://saturn.jpl.nasa.gov>) have been nominated for Webby's this year in the Science category. The awards will be made in early June. As the inaugural curator of the Solar System site, I'm especially proud, as the site still adheres to the pillars I established: accurate, timely, and easy to navigate. The site was originally commissioned by NASA Solar System Exploration Director Dr. Juergen Rahe in 1997; unfortunately Dr. Rahe died before the site went live. But I think he would be pleased.

By the time most of you read this, NASA's Deep Impact spacecraft will be nearing its quarry, Comet Tempel-1. I'll be waiting with scores of others to learn the effect of the impact on the comet. While preliminary results will be released in the hours and days immediately following the impact, more in-depth analyses will be forthcoming at science meetings this fall. One of these, the American Astronomical Society's Division for Planetary Sciences annual conference, will be in Cambridge, England, Sept 4-9 this year, so look for press releases in that time frame.

The next step in Mars Exploration is slated to launch in August, as the Mars Reconnaissance Orbiter blasts towards Mars on a massive Atlas V rocket. MRO will character-



Mars Reconnaissance Orbiter will arrive at Mars in March 2006, aerobrake to a lower, near-polar orbit until November 2006, and carry out its science observations for at least two years. It will also become part of the martian telecommunications network.

of Mars, and will identify potential landing sites for future missions. During its two-year primary science mission, MRO will conduct eight different science investigations at Mars. The investigations are functionally divided into three purposes: global mapping, regional surveying, and high-resolution targeting of specific spots on the surface. This will be the second and third attempts to deliver some of these instruments to Mars: a Mars Color Imager was aboard the ill-fated Mars Climate Orbiter, and a Mars

Observer and Mars Climate Orbiter. If at first you don't succeed Both of these instruments are designed to probe and monitor the Martian atmosphere. A shallow sounding radar will probe beneath the Martian surface to see if water ice is present at depths greater than one meter, and a spectrometer will be able to spot football-field-sized areas of minerals that may have formed in the presence of standing water. MRO will also carry the most powerful planetary imager yet, as its HiRISE camera will be able to resolve objects 4 to 8 meters across. A Context camera will provide context for images from HiRISE and the spectrometer. In addition, MRO will investigate the Martian gravity field and atmospheric structure. Although the trip to Mars will take only seven months, MRO will aerobrake for eight months, "walking" its initial elliptical orbit in closer to the planet, until it reaches a 255 x 320 kilometer (160 mile x 200 mile) near-polar orbit for science operations. Science observations are scheduled from November 2006 to November 2008. After completing its primary science mission, MRO will provide data relay for landed missions on Mars.

ize the surface, subsurface, and atmosphere

Climate Sounder was aboard both Mars

Interesting times, indeed!



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President's Message



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I was reflecting recently on the noticeable changes in the temperature, and the fact that the depths of winter will soon be upon us - well, upon some of us. Of course, if you live in the northern hemisphere, you are much better off temperature-wise for a while!

It's this kind of thing that makes me think back to the early days of my interest in astronomy, when I would collect a textbook from a local library here in Australia and open it up to read that Orion is a winter constellation, and that Scorpius is to be admired in the summer, even though it is low in the sky.

Of course, I soon became aware that the vast majority of books on our special subject are printed in the northern hemisphere. In the late 1960s, I acquired my first copy of *Norton's Star Atlas*, with its wonderful charts that actually showed stars to magnitude 6 and provided me with lists of things to see with my telescope. It was a wonderful period in my life, during which I learned to read upside-down when scanning the sky, so as to match what I was seeing with the unaided eye and binoculars with the objects on the chart. And the maps of the southern sky were just as good as those of the northern, so I was blissfully happy investigating the

many fine sights of the south - especially the wonderful collection of objects in the region of the Southern Cross.

And, gazing skywards toward the constellations, I was watching Orion on summer evenings, and Scorpius - in all its glory and nearly overhead - was a sight reserved for evening observation wrapped up in warm clothing.

What does this have to do with the IPS? It's because I often reflect on the fact that our Society is becoming increasingly international. I have already written in my previous Message about this topic, including my desire to increase IPS presence in parts of the world that are currently low on memberships, and my admiration for our Star Partners programme.

But my feelings go still more deeply than that, to think about the wonderful friendship we extend to each other around the globe. It would be hard to imagine a profession in which people from different countries would be so openly warm to one another! Right from the beginning of my professional life as a planetarian, I found that one of the greatest pleasures when travelling the world was to visit other planetaria. Naturally, learning what other places had to offer their audiences was important and fascinating, but the warm receptions, also, were a big part of those visits.

The enormous friendship between planetarians extends to those times when we are away from our domes. Late last fall - yes, the northern hemisphere fall - I was out observing one night with our Treasurer and Membership Chairman, Shawn Laatsch. We took a telescope out to a dark-sky site in North Carolina and had a great evening gazing at some northern sky gems. It was cold. Quite cold, in fact, but there we were, two planetarians under the largest dome of all. It was a lot of fun.

This brings me to mention how excited I am that we are now only just a year away from the first southern-hemisphere IPS conference - IPS 2006! The conference is planned so as to be centred on new Moon (which occurs on the Tuesday of the conference week), so that planetarians making a holiday out of the trip will have an optimal view of the southern skies, whether extending their trip a little before or after the conference.

Planning for IPS 2006 is going very well. Melbourne Planetarium astronomer Tanya Hill, APS President Martin Bush and the other members of the Local Organising Committee in Melbourne are an enthusiastic crowd, as is the separate Steering Committee drawn from a variety of people with both

astronomical and planetarium experience. These days, I find myself travelling to Melbourne quite frequently, as a member of the LOC, to keep involved in the planning.

Enough of being so southern-hemisphere oriented for now! As I write, my thoughts increasingly turn toward Beijing, where the IPS will hold its next Council Meeting on September 24-25. I'm thrilled that we are able to do this, and with the fine support we have to hold the meeting at the Beijing Planetarium. There will be plenty to talk about, especially with our continuing discussions about the future of the IPS - but more about that shortly.

If you are a member of an affiliate group, do speak with your representative in advance of the Council Meeting about any IPS issues that you would like discussed. Through your representative, you too will be present there, and one of the things that is very important to you all is the location of IPS 2008. We have four bids for that conference: The Scottish Power Space Theatre in Glasgow (Scotland); The Morelia Planetarium (Mexico), Chabot Space and Science Centre (Oakland) and Adler Planetarium (Chicago). I am hoping that all of the bidders will make a final presentation in Beijing; in the meantime, however, do consider these carefully, and pass on your thoughts to your representative. Especially, make use of any affiliate meetings or gatherings that you may have between now and September to discuss this and other issues!

In addition, of course, I am looking forward immensely to greeting affiliate representatives themselves in Beijing. China has a fascinating history and that, of course, includes astronomy. Not far from our meeting venue - the Beijing Planetarium - is the old Beijing Observatory, which dates back a long way and contains some fine examples of Chinese astronomical instruments. A country with such a past deserves to have plenty of planetaria to spread the word, and indeed it does. I am sure that our Council Members will return home feeling enriched by their experiences, and willing to share them with you all.

The timing of this issue is a good opportunity to remind all of you who are part of an affiliate group that your representative will be in Beijing to speak on your behalf. True, we are currently discussing the governance of the IPS and whether the present structure is the most appropriate way to continue, but it is and always will be important that IPS members have a voice in our activities. This is, of course, one of the reasons why I want to encourage the formation of more affiliates.

With regard to the future of the IPS, members around the globe will have been aware for some time that the IPS Council is deliber-

ating over the Strategic Planning Report commissioned by IPS and presented to us in 2004. It raises a number of questions and presents various options. For example, as mentioned above, governance - that is, the way we run our Society - has arisen as a central issue for us to consider. Perhaps you have some views or comments on this.

Again, working through your Council representative is important: Council members are continuing to work on these issues. Regional meetings, of course, are the ideal forum for this discussion, but I hope that all members of affiliates make use of their own local communication channels so that everyone, through their representative, can have a say. Don't forget that a list of affiliate representatives appears in every edition of the *Planetarian*.

It's time now for a reminder of upcoming events in the planetarian's calendar. Here, I have noted only meetings and conferences that are very specifically, or primarily, planetarium-related meetings. Do remember that a full list is posted on the IPS website! An exciting inclusion this year is the Australasian Planetarium Society meeting, which will be held in New Zealand for the first time.

June 14-18: South Eastern Planetarium Association (SEPA) conference hosted by Fernbank Science Center in Atlanta, GA.

July 12-14: Japan Planetarium Society (JPS) Conference, Osaka Science Museum, Japan.

August 13-14: Australasian Planetarium Society meeting, Stardome Observatory and Planetarium, Auckland, New Zealand.

September 7-9: Western Alliance Conference of Planetariums (RMPA, PPA, GPPA, SWAP) in Colorado at the Denver Museum of Nature & Science.

September 16-18: Nordic Planetarium Association Conference, Orion Planetarium, Jels, Denmark.

September 24-25: IPS Council Meeting in Beijing, China, at the Beijing Planetarium.

Again, make sure you check the website for the latest list of upcoming planetarium-related events: there are far more there than I have mentioned here.

Our website is continuing to operate well and once again I thank Alan Gould for his continuing work. If you have been having any trouble accessing the members-only section, do remember that the username and password have been changed. Please check back to the March 2005 issue of the *Planetarian*, which contained an insert with the



Visitors to Australia for IPS 2006 will be able to see many famous astronomical attractions - either on their own or during a post-conference tour. This is one of the most well-known of all: the 64-metre radio telescope near Parkes in NSW, well known from the movie *The Dish*. Photo courtesy Martin George.

new details!

Speaking of inserts, in this mailing of the *Planetarian*, you should find a CD of the proceedings of IPS 2004 in Valencia. Many thanks to Jose Carlos and the team in Valencia for their work in its preparation and to Dale Smith for ensuring that it has gone out with this issue. I, for one, greatly appreciate having the proceedings on CD, and I am aware that quite a number of our members prefer it that way, too!

You will recall in my most recent President's Message that Dale Smith and Shawn Laatsch have been working hard on our Star Partners Scheme. The Star Partners Fund is maintained through voluntary contributions by our members, and is used to aid planetaria in certain countries whose circumstances are such that they cannot easily become IPS members.

I am delighted to announce that the latest Star Partners Initiative has resulted in several responses thanking us, one of which is from a potential new member. All who have replied are

clearly impressed with, and grateful for, the materials that they have been sent. I have little doubt that by the time this issue is mailed out, there will have been more replies.

I would like to personally thank all of our members who contribute to this fund. It's all a part of the friendship enjoyed by planetarians around the world, about which I have already written.

As I finish writing this Message, I've just run a Saturday afternoon show. A little girl excitedly asked her dad if they could go out stargazing tonight. Dad has promised to get the binoculars out when they get home. It's currently cloudy and raining outside, but I'm sure he'll take her out at the first opportunity - because I sense that he wants to go out and take a look himself, too. It feels great for me to know that we planetarians around the world are all doing the same thing: adding to everyone's enjoyment of the night sky.

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Planets in a planetarium?

A planetarium should be all about simulating the night sky. That means everything should be in the right place at the right time. Since the invention of the opto-mechanical planetarium projector more than 80 years ago, the challenge has been getting those objects which moved against the starry background exactly right. As Ptolemy of Alexandria found, simply adding more epicycles and gears to a planetary system didn't make these motions accurate. And even today, most planetarium professionals must apologize for errors in their skies.

In recent years, multi-million dollar projectors in a few major planetariums have been able to improve accuracy immensely. But it is only with the introduction of the GOTO CHRONOS planetarium projector that this superb accuracy and speed comes to medium and small planetarium theaters. And it does so at a very reasonable price.

GOTO's patented* system of X-Y slewing mirrors and the sophisticated technology which drives them means that objects are located exactly where they should be, for any time and any place, within a matter of seconds. While other projectors drift farther and farther from reality as simulated months or years grind by, the CHRONOS sky performs brilliantly!

After all, isn't a planetarium supposed to take pride in showing the planets?



*U.S. Patent #6,821,125
Other patents pending

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I am honored to present this first installment of a new column entitled Digital Frontiers. My goal with this column is to bring to light some of the most interesting and useful news to planetarians regarding developments in the digital planetarium and "full-dome" video theater field. As part of this new focus, I will be collecting a series of articles on the promise and impact of fulldome technologies for publication in future issues of the *Planetarian*. If you wish to submit an article, please email me an abstract.

Now for the news.

As part of IPS 2004 in Valencia, Ryan Wyatt of the American Museum of Natural History and I founded and co-chaired the Fulldome Standards Summit. The Summit was conceived to be the first in a series of Fulldome Summits designed to bring together industry leaders - from institutional to corporate, technical to artistic - to advance the state-of-the art in fulldome video through technical exchange and the formation of industry standards and recommended "best practices." Proceedings of the Fulldome Video Summit are now available at the fulldome.org website and include 13 excellent papers forming a technical and philosophical foundation for the development of future fulldome standards and guidelines. The event was co-sponsored by the National Science Foundation, Denver

Museum of Nature and Science, Spitz, Inc., Thomas Lucas Productions, Inc., and IPS. Thank you to all who attended and participated!

Two recommendations that arose in the Summit's roundtable forum were to perform a survey of fulldome theaters, and to form an IPS ad hoc committee dedicated to the fulldome community. I am happy to report that both of these goals have finally been accomplished. The *Fulldome Theater Compendium ONLINE!* was created by Loch Ness Productions with support from the sponsors of the Fulldome Standards Summit as part of the final documentation phase of the project. The ongoing registry of fulldome theaters can be found on the web at www.lochness.com. There is no charge to view the *Fulldome Theater Compendium ONLINE!* listings, which contain detailed information on over 125 institutional and portable theaters. We also encourage all operators of fulldome theaters to take a few minutes to update your facility's data by completing an update form. Current, accurate and detailed information (added in the text box) regarding your particular fulldome system will benefit everyone, including institutions and producers seeking grants, vendors embarking on product development projects and IPS in furthering its organizational goals.

Prior to the end of his term last December, in response to my request, IPS President Jon Elvert officially formed an Ad Hoc committee on Full-Dome Video. Fulldome (as we affectionately refer to it) video graphics has captured the imaginations of the planetarium community with its ability to deliver immersive visualizations of virtually any phenomena in the known universe, from quantum physics to the large-scale structure of the universe. Fulldome systems are not yet able to reproduce the stunning resolution and contrast of a high-end opto-mechanical night sky or, in some cases, even a 35mm slide projector. However, the flexibility of these systems (all digital - no film to develop, random real-time access to astronomical data), and their compatibility with modern 2D and 3D astronomical and astrophysical data and simulations is considered by some institutions to be equally important to, or in some cases, to overshadow the need for a near-perfect starry night simulation.

Whatever your inclinations or institutional imperatives, I think you'll agree that fulldome video is an important development in the planetarium profession and its use as a tool will grow with time. In this spirit, the IPS leadership decided that it was time to take a more active role in facilitating com-

munication among the fulldome community, and in guiding the application of these systems into the planetarium environment. I applaud the IPS leadership for their vision and thank them for their support in creating this new ad hoc committee.

The official Fulldome Video Committee description appears below. It is intended to be quite general, covering activities such as technical paper sessions at conferences, standards and guideline formation, adoption of common nomenclature, operation of an official website and more. We are also using the term "planetarium" in the most general sense, including portables, classrooms, and large public theaters. Once all the founding committee members are selected we will vote to keep or change this description.

Full-Dome Video Committee

Function: To facilitate communication between the programmers, manufacturers, owners and operators of full-dome video graphics systems in planetariums, and to provide structure and guidance for the application of these advanced technologies within the planetarium environment.

As Chair of the new committee, it is my job to select an initial group of committee members. Clearly this can be a difficult process. On the one hand, there are dozens of hard working professionals in the fulldome community who would all qualify to serve. On the other hand, too many cooks could spoil the pot and make it difficult to deliberate in a timely fashion. In addition, I have been asked by the IPS leadership to take special care to be impartial in the representation of vendors on the committee. Also, IPS is an international organization, so the selection process should be without regional bias (I apologize for the language bias).

The Fulldome Video Committee has issued a "call for members" in an effort to attract an initial membership that spans the entire fulldome community, including institutions, vendors, users and programmers. If you are able to volunteer substantial time to the fulldome committee over the next year, have a passion for helping to advance the fulldome medium, and are willing to maintain a professional, unbiased attitude, I encourage you to apply. My goal is to accept all interested parties, but obviously if the response is too great some selection process will have to be adopted. To apply please send me an email including your position, institution or employer, contact info including phone, snail mail and email address, number of years experience in the planetarium field,

(Please see *Digital* on page 62.)

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NASA/GLPA Focus Group

A NASA and Great Lakes Planetarium Association (GLPA) Focus Group convened on 27-28 January 2005 at NASA's Glenn Research Center in Cleveland. This was one of 11 Explorer's Institutes funded by NASA's Informal Education Division.

The Focus Group was officially titled: *Planetariums as Conduits to NASA's Target Audiences: A Two Day Focus Group on How Best To Deliver NASA's Science & Technology Explorations To Small & Mid-Sized Planetariums*



Colleagues continue to discuss exciting ideas during "seventh inning stretch!" Photo by Susan Button.

Prior to attending the meeting we were asked, by e-mail, to fill out a questionnaire that related to our professional experience, previous collaborations between NASA and planetariums, and our views of future opportunities for collaboration. This was an effective way to gather information that was then used to formulate some initial points of discussion.

The two-day focus group was a giant brainstorming session. It was exciting and exhausting! Everyone felt that this get-together was one of the most productive meetings that we have ever attended. We were able to develop several concrete strategies that, if adopted, will help NASA and planetariums work together more efficiently and help each of us to more easily accomplish our educational goals. We are certain that our two-day session will positively help to shape a more collaborative relationship between NASA and planetariums.

The focus group was comprised of 24 planetariums from planetariums from across the nation and 12 educators, scientists and related staff from various divisions of NASA. Chuck Bueter (bueter@rad-inc.com) and Bob Bonadurer (RJBonadurer@mplib.org) were the focus group organizers and reporters. Jim Sweitzer (sweitzer@sciencecomms.com) and Liz Monroe-Cook (monroecook@comcast.net), led the focus group process with assistance from Joel Halvorson (halvor@smm.org). Rob LaSalvia (Robert.F.Lasalvia@nasa.gov), with the education program at Glenn, was our site host.

Our final report was sent to Debbie Gallo-way and Jason Freeman at NASA's Informal Education Office. The results of the seven strategies we voted on fell into three categories with an overall favorite being the item listed with the number 1 below.

The results are rated 1-3 according to our votes:

1. Jointly draft a Roadmap to plan joint programs 5 to 10 years out.
2. Establish a liaison or single point of contact method for NASA/Planetarium collaboration.
2. Project PLANET: Combines features of Explorers Schools and Solar System Ambassador Programs
2. Engage Formal Educators for the development and implementation of pre & post planetarium visits,
3. Offer Training Planetariums to use NASA Materials,



Jim Sweitzer helped us organize our thoughts. Photo by Susan Button.

3. Develop an On-Line Communications Plan with NASA to serve Planetariums,
- 3 Create an Internship and exchange program to support needs of Planetariums.

Our focus group's results were presented at the collective Explorer's Institute meeting, in New York, on March 14-17. Liz Monroe-Cook and Jim Sweitzer did such a great job leading our focus group in Cleveland that they were chosen to lead the NYC's meeting.

The final report and composite evaluations are posted on the following website: *Planetariums as Conduits to NASA's Target Audiences* (<http://www.transitofvenus.org/focus.htm>).

Opportunity for Training: Summer Institute

24 July to 6 August 2005: The College of the Atlantic in Bar Harbor, Maine (USA), is offering a two-week, four-credit residential summer institute for teachers that includes a course on instruction in using a portable planetarium and information about grant writing for participants to acquire a portable planetarium. Website - <http://www.coa.edu/summer/sumworkshops/index.html>

For more information contact: Jean Boddy, 1 (800) 597-9500.

Digital Institute 2005

Spitz Inc, located in Chadds Ford, Pennsylvania (USA), will hold its first annual Digital Institute this July 18-21. During the four-day Institute, participants will explore astronomy education techniques using digital technology and tools. Courses will cover a broad range of digital planetarium topics from basic techniques and terminology, to advanced lessons creation with 3D simulation software. For more information go to: http://www.spitzinc.com/digital_institute/index.html.

Starlab/Portable Planetarium email list:

This January Gavin Hoffman (gavinhoffman@yahoo.com) emailed to say,

"Hi Susan, Jeanne Bishop gave me your name as someone to contact. I recently purchased a used Starlab for my startup planetarium business here in South Carolina. I understand that you have a topic-specific list that I might sign up for, and I'd love to do that, whether that means you putting me in manually, or me sending email/visiting a web page to sign up. If there's anything else I need to do, please feel free to let me know. I'm eager to have contact with fellow small-domers who (I'm sure) have wonderful ideas for a traveling program."

My Reply:

"Hi Gavin, Welcome to the fold. Basically you should get in touch with Learning Technologies to make sure you get their newsletter. I will send a list to you of people doing business with a portable and a survey to fill out and for you to use as a guide to ask questions of other business owners. I hope you will share information with me about what you are doing and I can publish that info in the International Planetarium Society's journal."

Starlab Business:

Again in February I received mail from Anthony D. Masuku (tonymasuku@yahoo.com) stating, "I am planning to start a starlab business. I just want to know what challenges you came across. I am located in London, UK, and I am so motivated to getting this business started ASAP. I saw your name from the Starlab educators list."

My Reply:

I also sent Tony a list of people doing business with a portable and a survey to fill out and for him to use as a guide to ask questions of other business owners. I requested that he too share info with me about how/what he is doing.

Funding Sources:

In February, Alain Carriere (President of The Sanctuary of the Stars, 602 W. Riley, P.O. Box 1425, Freer, Texas 78357 USA; cell phone: (361) 227-1084; email: SanctuaryofStars@aol.com) wrote to ask about funding sources. He wrote,

"Good afternoon Mrs. Reynolds Button. I am the founder, with my spouse, of a non-profit organization called *The Sanctuary of the Stars* that is dedicated to informal science education in astronomy and astrobiology. We have, as a first step in a more ambitious project, planned to purchase a mobile planetarium and put it in service in Texas (for the moment) ... Our purpose is not only to conduct presentations but to allow, too, the public to have a direct contact with the sky via the organization of star parties. Having a long experience of a such activity when I lived in France ..., we would like, however, to know how exactly to get the

necessary funds to be able to purchase the necessary equipment (I will submit a proposal soon to the National Science Foundation but I would also like to know if there are other sources of funding for a such equipment). Any advice will be welcome with gratitude, this project being very dear to our heart. Staying at your disposal for any additional information you might need and thanking you very much in advance for your help."

My Reply:

"The National Science Foundation is a good source. As another option, you can go to the Learning Technologies, Inc. website at <http://www.starlab.com/order.html>. There you can order "Funding information for STARLAB" (includes three booklets on general and corporate funding)." The next best thing might be to contact your local regional STARLAB representative to see what funding strategies have worked for their clients in the past. These representatives are listed on another LTI website page: <http://www.starlab.com/sldeal.html>."

You might also look into other portable planetarium manufacturers, your regional planetarium association, and/or the NASA Space Science Education and Public Outreach (E/PO) Program. (You can go through your NASA regional center <http://www.nasa.gov/about/sites/index.html> or to get started you can go to <http://education.nasa.gov/home/index.html>).

Are there any other options you, my colleagues, think I could have mentioned?

Portable Planetarium Rental:

Later in February Joy Matsumoto (joymats@sbcglobal.net and joymats@yahoo.com) wrote to inquire about how to rent a portable planetarium. She explained, "Hi, I have volunteered to research how to rent a portable planetarium for my daughter's school. Old Orchard School is a small private K - 8 school located just south of San Jose, California. Can you provide me with any information that could help us locate an institution that could rent us a portable planetarium and the canisters to present a variety of material for this age group."

My Reply:

I told Joy that she could probably get better information from the California STARLAB portable planetarium representative and gave his contact information.

Does anyone out there know if other portable manufacturers have information about rental equipment?

Molecularium:

I previewed this show in February at The Junior Museum (250 Jordan Road, Rensselaer Technology Park, Troy, New York USA). Planetarium director, Derek Sweeney Kesler

(sweend@RPI.edu) explained that the projection system he used was a JVC video projector that was retrofitted with a fisheye lens. His particular system is called the elumenati (<http://www.elumenati.com/products.htm>). It is also called a HAL Fisheye Projection System with projection angles ranging from 135° to 220°. The image was very clear from top to bottom.

The object of this show was to "introduce students in grades K-3 (5- to 9-year-olds) to simple material science concepts, including the states of matter — solids, liquids, and gases ..." (<http://www.molecularium.com>)

I found the characters charming and the action entertaining but too fast to accomplish the stated educational goals. The storyline seemed unclear and disjointed at times with some of the characters behaving in ways inconsistent with the science. I believe the concepts would be more appropriate for grades 3-4 (8- to 11-year-olds). The show goes into beta testing now and I am sure some good changes will be made based on feedback from teachers and students. I look forward to seeing the final product.

<http://www.rpi.edu/homepage/molecularium.html>.



Students at The Junior Museum planetarium prepare to enjoy the show! The elumenati projector is mounted in the tall box to the right. Photo by Susan Button.

The micro world has hit the planetarium field — again!

Christine Shupla (Manager of Theaters, Arizona Science Center, 600 East Washington St, Phoenix, AZ 85004 USA; phone: 1 (602) 716-2078; Email: shuplac@azscience.org; Website: www.azscience.org) recently wrote to Dome-L, "Greetings, all! The planetarium staff at the Arizona Science Center is pleased to announce that we are distributing our



Kathy Michaels enjoyed previewing the show and meeting “Oxy” and some other animated molecules. Photo by Susan Button.

first show kit, ‘The Smallest Stuff in the Universe,’ about atoms, nanotechnology, and how it all relates to astronomy.”

When questioned, Christine commented further, “I read about the Molecularium show someplace and was surprised at the similarities! I believe that one is a full-length show, rather than a mini-show, and there may be some other differences. (Our science center received a grant, in conjunction with ASU, to do some outreach on nanotechnology a while back, and we eventually decided that a planetarium show might be more effective at reaching a broader audience than the nano demo they had put together.) The vocabulary is roughly 3-4th grade and up; we keep it all very simple.” If asked, Christine may send you a copy of the production notes (which includes the script) and the visuals list as pdf files”

Christine is correct that this show differs from Molecularium; it is not entertainment trying to educate. It appears, from the script and visuals list, that this show is designed as a lesson/lecture that is made entertaining by the visuals. The content sounds a bit heavy for the targeted age groups; perhaps the visuals assist with that. I hope to see this interesting new show in the near future.

It would be enlightening to compare each of these show’s effectiveness as determined by audience testing!

Web Links for Earth and Celestial Objects for Teachers of Grade 1 (6-7 year-olds)

As we all know, it is extremely important to use age-appropriate materials and activities when working with our clients. Sources for Primary Level students are sometimes difficult to find. After doing a little research I found several sites of interest. The following list of websites may be of use in your work:

Day and Night in Real Time

This link provides you with a visual image of the earth. This satellite image shows the progression of day and night in real time.

<http://www.fourmilab.ch/cgi-bin/uncgi/Earth/action?opt=p>.

NASA for Kids

This site is geared toward older students, but has some excellent resources for teachers, as well as many useful visual aids.

<http://www.nasa.gov/audience/forkids/home>

Astronomy for Kids

This site provides read-aloud information and pictures defining and explaining various aspects of astronomy.

<http://www.frontiernet.net/~kidpower/astronomy.html>

Star Child: A Learning Center for Young Astronomers

This NASA site is very kid-friendly. Although it is too advanced for first-graders to explore independently, it would be an excellent resource for an enrichment lesson on the topic of astronomy, and would lend itself well to computer LCD projection for whole-class viewing.

<http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html>

Sky Paths: Studying the Movement of Celestial Objects

This link provides extensive plans and resources for studying the movement of celestial objects.

<http://btc.montana.edu/ceres/html/SkyPaths/orbits1.html>

Astronomy for Kids

This site provides an excellent resource for teacher background. Its content is too difficult for first graders, but can be a helpful resource for when you’re asked those difficult questions!

<http://www.dustbunny.com/afk>

The Space Place

This NASA site for kids offers a variety of information, pictures, and games for kids. It is generally too advanced for first graders, but you may find some pieces you can use.

<http://spaceplace.nasa.gov/en/kids>

Space and Astronomy for Kids

This site offers a multitude of links and resources on the topic of space. Once again, it is aimed at an older crowd, but could be useful to teachers of first graders!

<http://space.about.com>

SolarViews.com

This site provides a resource for pictures of planets and other celestial objects.

<http://www.solarviews.com/ss.html> (English, Spanish, Portuguese, French and German)

KidsAstronomy.com

This site provides astronomy information and activities for kids. One interesting feature is the ability to display a night sky in real time. It is too difficult for 1st grader navigation, but could be a useful resource.

<http://www.kidsastronomy.com>

Star Count – A Collaboration

The following four programs will be collaborating soon to empower students to make an accurate global star count. While attending the National Science Teachers’ Association annual conference in Dallas last week, I was able to speak with the folks from the GLOBE project and they informed me that they would soon be working with NOAO and IDA to design and initiate star count protocols for students around the world. Loris Ramponi (Italian Planetaria’s Friends Association) has been interested in this idea for quite some time. He agrees that this international star count is something that we planetarians can certainly help to facilitate (especially on the International Day of Planetaria).

I have been assured that an announcement will be forthcoming to further inform us of the details of this project.

GLOBE

“GLOBE is a worldwide hands-on, primary and secondary school-based education and science program. For students, GLOBE provides the opportunity to learn by:

- Taking scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover/phenology - depending upon their local curricula
- Reporting their data through the internet
- Creating maps and graphs on the free interactive web site to analyze data sets
- Collaborating with scientists and other GLOBE students around the world”.

<http://www.globe.gov>.

NOAO

“The National Optical Astronomy Observatory was formed in 1982 to consolidate all AURA-managed ground-based astronomical observatories (Kitt Peak National Observatory, Cerro Tololo Inter-American Observatory, and the National Solar Observatory with facilities at Sacramento Peak, New Mexico and Kitt Peak, Arizona) under a single Director. Today, the National Solar Observatory has its own director. NOAO also represents the US astronomical community in the International Gemini Project through its new NOAO Gemini Science Center.

NOAO’s purpose is to provide the best ground-based astronomical telescopes to the nation’s astronomers, to promote public understanding and support of science, and to help advance all aspects of US astronomy. As a national facility, NOAO telescopes are open to all astronomers regardless of institu-

tional affiliation.”

<http://www.noao.edu>

IDA

The International Dark-Sky Association, a tax-exempt non-profit membership-based organization established in 1988, strives to be effective in halting the adverse environmental impact of light pollution on dark skies by building awareness and by educating the public about the value and effectiveness of quality nighttime lighting. IDA is also active in building awareness of the adverse problems affecting astronomy from radio frequency interference (RFI), space debris, and any other environmental impacts that have the potential to destroy mankind’s view of the universe.

<http://www.darksky.org>.

Italian Planetaria’s Friends Association

Thanks to the creative initiative of Loris Ramponi (IPS Affiliate Representative of the Italian Planetaria’s Friends Association) an International “Day of Planetaria” has been held in several countries yearly since 1995. This day is an important opportunity for

involving the international community in a collaboration that aims to promote knowledge of planetariums to the public. The next “Day of Planetaria” will be held on March 19, 2006. To learn how to join in the activities of this special day go to http://www.bresciascienza.it/cityline/cult/Grup_sci/planeta.html.

Practice

You can get the idea and practice making star counts, until we get the official GLOBE protocol, by using the information on one of the following sites:

Make a Star Count - “Seeing Stars” (<http://www.musc.edu/cando/auast/makeasta.html>)

This activity encourages students to observe the quality of the night sky and to determine the number of stars that can be seen from their local area.

Instructions for Star Count Observation

<http://astro.wsu.edu/worthey/astro/html/starcount.html>

Star Count Instruction and Data SHEET

<http://www.guam.net/planet/STRCNT/DATASHT.htm>

Future PIPS Meetings:

The next two Powerful Interactive Planetarium Systems (PIPS) meetings will be held in August 2005. The August 4-5, 2005 meeting will be held in Grand Rapids, Michigan, USA, and the August 22 meeting will be held in Schenectady, New York, USA.

PIPS meetings are for those primarily interested in using a portable or small stationary planetarium to present participatory lessons to school children and their teachers. Typically, teacher planetarians who are working full or part time in a small or portable planetarium attend PIPS meetings but they are open to all educators interested in astronomy and space science.

All past participants in PIPS get-togethers have said meeting with colleagues in this way gave them a needed “shot in the arm” to their efforts in teaching astronomy and science in general. If you plan to be in either area this August and would like to join us, please email me and I will send the meeting details to you. ☆

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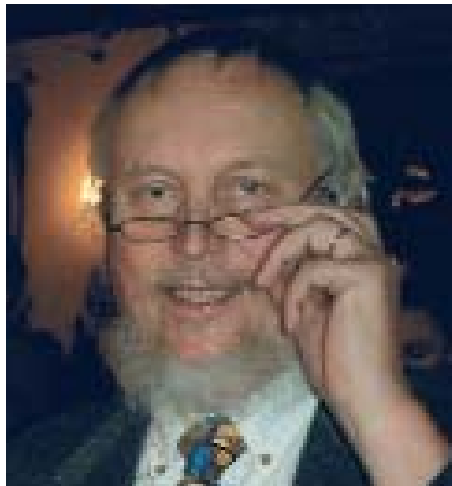


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The editing of this column is being finalized while I'm in Falun hospital, a laptop on my lap and a tube connected to a blood vessel in my left hand, feeding some blood thinning liquid from a bag hanging in a large rack on wheels. I plan to be out from here soon and participate both in the IPS mobile planetarium meeting in Nantes, France, in May and the ECSITE conference in Helsinki, Finland, in June.

The International News column is dependent on contributions from IPS Affiliate Associations all over the world. Many thanks to Agnès Acker, Bart Benjamin, Tony Butterfield, Ignacio Castro, Gail Chaid, Kevin Conod, Teresa Grafton, Andreas Hänel, John Hare, Chris Janssen, Erik Koelemeyer, Uwe Lemmer, Loris Ramponi, and Zinaida Sitkova for your contributions. Special thanks are due to Loris Ramponi for collecting the data for the Calendar of events. You are welcome back with new reports, and I look forward to contributions from other associations as well. Upcoming deadlines are 1 July 2005 for *Planetarian* 3/5 and 1 October for 4/5.

Association of Dutch-Speaking Planetariums

Report of the ADSP meeting of 17 November 2004, Planetarium Brussels: Before the meeting there was a workshop *From stitching digital images to AllSkys in Digidome*. During this workshop Johan Gijsenbergs from Sky-Skan wanted to give the attendees hands-on experience in producing AllSkys for our planetarium. He started with explaining the hardware/software. Outside the planetarium in Brussels they took a 360° image to work with. Back inside they loaded the images into Panorama Tools for stitching them into one image. Some work in Panorama tools and then Photoshop gave an image ready for Digidome. In these 2 hours and 30 minutes Gijsenbergs made everybody enthusiastic in producing their own AllSkys. It does not look very hard but they will see how to manage without his helping hand.

After the workshop, Chris Janssen opened the meeting of the ADSP. The report of the last meeting was agreed upon and no new points were added to the agenda. A financial overview was given by Johan Gijsenbergs (treasurer). A report on the IPS 2004 was given and some issues came forward. It was decided that one person will attend the IPS Council meeting in Beijing in September. The Europlanetarium will become one of the gateways to the new National Park Hoge Kempen, so starting from 2006 they will be constructing a new building that will help in receiving more people. More information



360° image used in the workshop *From stitching digital images to AllSkys in Digidome*. Courtesy of Johan Gijsenbergs.

will follow.

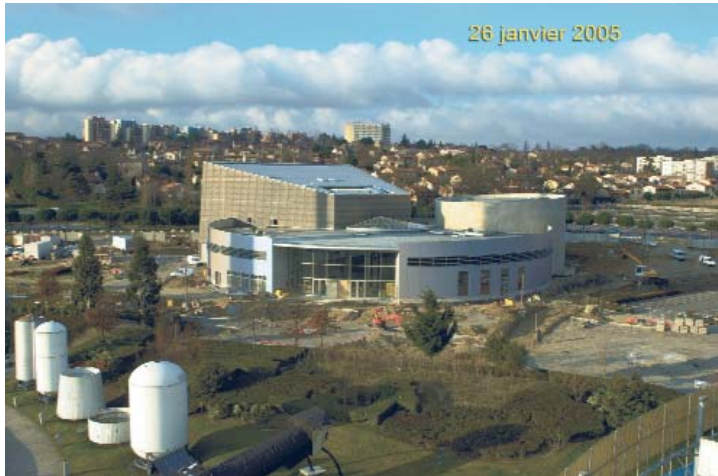
News in short: The next meeting of the German Planetaria will be held in Genk at the Europlanetarium on 10-12 April. The Europlanetarium is hosting the European symposium on light pollution at the end of April. The Artis Planetarium is looking to install an All-Sky video system. In April 2005 there will be a new digital all-sky system installed in the Planetarium Ridderkerk, a system with two fish-eye projectors in cooperation with Sky-Skan. Cappelle-la-Grande is working on two new shows. They are also looking for two optical zoom projectors. The Europlanetarium has bought 14 new slide projectors and the Windows-based Spice system. The next ADSP meeting will be at the end of April 2005; the place and date will be decided upon by Chris Janssen, christ.janssen@telenet.be.

Association of French-Speaking Planetariums

The first colloquium organised by APLF was hosted by the prestigious building of the European Council in Strasbourg on 7 May 1984. 150 people came from a dozen countries, including Russia. Four other European colloquia were organised later by APLF: Cité des Sciences de La Villette, Paris 1986; ESO, Garching, Germany, 1992; Strasbourg (Conseil de l'Europe) 1999; Bruxelles and Genk, Belgium, Villeneuve d'Ascq 2002. In 1999, the IPS Portable Planetariums joined APLF. This happy event will be reproduced in 2005; our IPS President Martin George, President-elect Susan Reynolds, and Council member Lars Broman will be present in Nantes 5-8 May.

New planetarium and ongoing projects: Rennes and Dijon are in a decisive step for a new planetarium. Nantes will renovate the equipment for a numerical system.

The Planetarium in La Cité de l'Espace in Toulouse, will be born again, under the supervision of Marc Moutin, APLF Vice-President. Astralia is a new complex, including an IMAX (300 seats) installation with a 376 m² screen with a classical 35-mm projector and a video projector "cinéma numérique", two conference rooms (130 and 50 places) with all audiovisual facilities, a preshowroom with a 14-m screen, an entrance hall with 11 large screens informing the visitors in real time on the whole program (animations, description on the shows, restaurant menu, the bargain of the day in the shop, etc., and, first of all, the new planetarium, with a DigiStar3 projector, a 20-m dome and 274 seats. Monday 9 May this wonderful place will be opened.



The Astralia complex, Cite de l'Espace, Toulouse. Courtesy of Marc Moutin.

Association of Mexican Planetariums

A series of astronomical activities took place during the celebration of the 15th anniversary of the astronomical observatory of the Sonora Ecology Center. Participating was the Carl Sagan Sonora Astronomical Society, offering lectures and observation sessions, as well as shows in the mobile planetarium Ludocosmos. The purpose of joining efforts towards an astronomy education is to have a greater impact on the community, individuals, and interested groups. Coordinated astronomy activities have been carried out at various Sonora State sites, which will become part of the Sonora Astronomical Net, making it an interesting model to regionalize astronomical diffusion, which could be copied by other communities worldwide.

Life in other worlds - Are we alone? is the new show being presented at Papalote's Digital Dome, depicting life in the ocean depths and seeking it beyond the solar system, with fly-bys of Mars and Jupiter's moon Europa, telling us about how researchers are looking for life, alternating with last year's *Passport to the Universe* show. An astronomy course, *A Vision of Cosmos*, is being offered to complement public interest. The Poveda Planetarium from the Culiacán Science Center in the State of Sinaloa lists a series of interesting astronomical topics in Spanish through their web page <http://www.ccs.net.mx/planetario>. In its bulletin section (Boletín astronómico), various news, monthly articles, and useful and interesting links can be accessed.

And finally, most of you must have already received promotional e-mails from the Lic. Felipe Rivera Planetarium in Morelia, depicting nice designs and photos with the slogan "We'll see you in 2008" as the proposed site for the 2008 IPS Conference. Planetario@ceconexpo.com is its e-mail.

Mexican planetariums wish it will be selected as the official 2008 IPS site.

British Associations of Planetariums

BAP is girding its collective loins for the annual meeting in May - an occasion shared with the AAE (Association for Astronomy Education). This year we are going to meet in

Manchester at the Museum of Science and Industry - but more of that next time, when there should be plenty to report. Increasingly our meetings are taking on some of the aspects of an IPS conference, albeit on a very small scale! They now take place over a weekend, as opposed to being a one-day event, and are seen as an opportunity to showcase some of the technical developments revolutionising this business. This is, of course, in addition to the main focus, which remains as always to meet each other and share ideas and experiences.

The National Space Centre in Leicester is in the process of building a new, highly interactive gallery devoted to human space flight. Visitors will be able to explore a Moon base set 20 years in the future. In addition the NSC's Space Theatre is about to go full dome with the installation of a DigiStar3 system as part of a Spitz upgrade. Work on a new space theatre show for 2006 is already underway. In addition, a new education block is being constructed at the base of the Centre's iconic rocket tower.

Thinktank, Birmingham Science Museum, is installing a new full-dome theatre in its Futures gallery. Through exploration and interactive learning, the museum demonstrates the effect of science and technology on our lives, The *Futures* gallery will offer a glimpse of how we might be living tomorrow by offering a constantly changing event schedule. This will consist of a combination of automated and presenter-led shows, providing a spectacular venue to explore a wide range of science and technology topics. Shows planned for the digital theatre will include space, bio-medical, and themed art presentations.

Moving from the new kids on the block to a real old timer, the London Planetarium's director from 1968 to 1989, John Ebdon, died in March. Undine Concannon, his successor, has written more fully about his career earli-

er in this issue. It is unlikely that he would have recognized the place in which he worked for so many years. Today the Planetarium (now referred to as the auditorium) functions as part of Madame Tussauds and its technology is being used accordingly. However, a full programme of curriculum-based school shows continues to do business, and earlier this year an evening event - *The Future of the Cosmos* - drew a capacity audience to hear Professors Michio Kaku of City University New York and John Barrow of the University of Cambridge debate some of the most exciting ideas around - parallel worlds, alternative universes, notions of infinity and the future of humanity - and to ask them questions.

Canadian Association of Science Centres

In February Discovery Dome theatre in Calgary opened *Gravity Rules!* as its main multi-media show for the public. They adapted the show for the theatre by adding Digistar components and localizing it for Calgary and Canada. The show has been playing to excellent houses through the late winter and spring. It serves the prime audience of families with kids ages 6 through 12.

While science shows incorporating live actors were what the Discovery Dome was designed around, during the last few years production staff concentrated on major "canned" public programs such as *The Quest for Origins* and their new seasonal favorite *The Halloween Show*. In addition they completed a full roster of curriculum-oriented school shows with unique science topics (not always astronomy) at each grade level from K to 6. The school schedule includes dome shows on topics such as Seasonal Changes, Small Animals and Insects, Sound, Light and Shadows, Weather, as well as the more traditional planetarium school fare of Sky Science. Contact is: Alan Dyer, alan.dyer@calgaryscience.ca.

Currently the H.R. MacMillan Space Centre in Vancouver produces a new School/Public Planetarium show on the subject of extreme environments. The show will identify three extreme environments on earth and relate them to extremes that exist in the solar system. The challenges of the extreme pressure experienced by explorations of the deep sea are likened to the extremes in pressure that confront attempts to explore the surface of the planet Venus. A project to drill into Lake Vostok in Antarctica and search for microorganisms is compared to a future mission to Europa, where plans call for the exploration of a liquid ocean under the moon's thick frozen crust. The show will be produced in a "game show" format. In each extreme terrestrial environment, a research scientist working in the field will describe

the nature of the extreme and the results it would have on an unprotected human. The audience is then asked to identify a similar extreme environment elsewhere in the solar system, and the prize is a simulated trip to that moon or planet. *Going to Extremes* opens at the H.R. MacMillan Space Centre in Vancouver, on 1 July 2005. For information contact Erik Koelmeier at ekoelmeier@hrmacmillanspacecentre.com.

Since mid-May, the Montréal Planetarium is presenting the show *It's All Relative, Mr. Einstein!* This show exploring the theories of relativity is our contribution to the 2005 Year of Physics and to the centennial of the publication of the Special Theory of Relativity. This multimedia show, created by Planetarium Astronomer Marc Jobin, lasts for 35 minutes and is immediately followed by a presentation of the current night sky. The show *Astro-Quiz*, for students aged 10 to 12 years old, has begun recently as well. This interactive show mimics television game shows as it teaches about the Moon and the planets. This summer, the planetarium will prepare a new evening show to be offered in the fall. This show, untitled as this is written, will explain the life and death cycle of stars. Contact is Pierre Chastenay chastenay@astro.umontreal.ca.

The planetarium at The Manitoba Museum in Winnipeg is presenting a special series of evening shows unlike any of our previous programs. *Planetarium @ Night* is a live, "talk show"-style program about cutting edge science that features a live musical guest - about what you'd get if you put Carl Sagan, Jay Leno, and Laser Floyd in a blender. The show begins with an opening monologue which includes some current sky information (constellations, planets, and upcoming events) and a short "rant" on the topic of the day - designed more to confront or provoke than to educate in the traditional sense. Then, while the audience mulls over the topic, the band comes out and plays a short (15-minute) musical set with accompanying visuals. This is followed by a second monologue, revisiting the topic of the day with more explanation and interactive questions from the audience. The band then comes back for a second set to take the show out. Topics have ranged from the X-Prize race to Light Pollution to the Moon "Hoax".

The show is making a big impact, attracting a new audience to the planetarium - the treasured "youthful cynics" aged 20-35 who haven't been at the facility since their grade 6 field trip. It's also making a splash in the musical world: managers and promoters are calling, and the bands are donating their time to benefit the planetarium. The Canadian music awards, the Junos, are in Winnipeg in 2005 and the planetarium will have special shows in conjunction with the

awards. Contact is Scott Young scyoung@manitobamuseum.ca.

Victoria at Vancouver Island acquires a planetarium with the purchase of a Starlab at the Centre of the Universe, the interpretive centre for the Dominion Astrophysical Observatory's Plaskett Telescope which, at its opening in 1918, was the biggest in the world. The Observatory itself has been a local landmark for almost 90 years now, but the interpretive centre is a recent addition, celebrating its fourth anniversary in June 2005. Last November, the Centre acquired a Starlab Portable Planetarium in order to reach not only outlying schools, but also to set up at community events, such as this summer's Saanich Fair and the Tall Ships Festival. Since the planetarium on site at the Centre is also a Starlab, they have the advantage of having interchangeable cylinders and shows that can be produced for both planetariums.

The hard work of the staff at the Centre has fostered a wonderful relationship with local schools over the past few years. This relationship will continue to grow as they hope to see their area of coverage expand to the whole of Vancouver Island. Contact is Steve Ewald Steve.Ewald@nrc-cnrc.gc.ca.

Council of German Planetariums

In 2004 more than 1.8 million people visited German planetariums, with the new planetarium in Hamburg as the main attraction and highest attendance (some 382,000). For the Einstein Year 2005, the Zeiss Planetarium in Bochum with its new director, Dr. Susanne Hüttemeister, will produce the planetarium show *Einstein and Black Holes*. This



Poster for the planetarium show *Einstein and Black Holes*. Courtesy of Zeiss Planetarium Bochum.

program will be distributed among the German planetarium community as an initiative of the Council of German Planetariums. More than a dozen planetariums intend to participate in presenting this show, and others will make use of the animations that were exclusively produced for this program. CGP is optimistic about receiving a grant from the national Einstein Bureau, which is the governmental organization for the coordination of the Einstein Year, so that the show can be produced on a cost-to-design level.

Some other local initiatives will result in Einstein programs within the year, such as a new show *Einstein's Universe* produced by Alexander Colsmann for the planetarium in the Deutsches Museum (not to be confused with the other Munich planetarium in the Forum close by; see report below). It will have its premiere on 5 May on the occasion of the opening of an extensive exposition on Einstein and his work in the Deutsches Museum in Munich. This planetarium show will also be available for distribution among planetaria through www.chimpanzee.de.

Unfortunately, Munich is also the voice of sad news coming from Germany because one of the largest and most modern planetariums had to be shut down for financial reasons. The planetarium in the Forum am Deutschen Museum ceased operation in early February after a years-long battle against financial problems. The planetarium with a Zeiss Model VII under a 20-meter (67 ft) diameter dome is located in a building close to the Deutsches Museum. It was opened in 1993 as a privately funded enterprise together with an IMAX and two small cinemas in separate parts of the Forum. There might be a small hope for a revival of the facility, because the whole equipment was bought by the owner of the building who remained silent about his plans for the future of the Forum.

During the conference at the Europlanetarium in Genk, Belgium, the new chairman of the Council of German language planetariums (RDP) was elected. He is Eduard Thomas from the Mediendom in Kiel, eduard.thomas@fh-kiel.de. Andreas Hänel will serve as vice-chairman. Thomas Kraupe was elected as CGP representative at the IPS council meeting in Beijing.

Great Lakes Planetarium Association

GLPA will host its 40th Anniversary Conference in Grand Rapids, Michigan (the site of its very first conference in 1965) on 19-22 October 2005.

Illinois. The Lakeview Museum Planetarium in Peoria held its 7th Annual Interplanetary 5K Race/Walk in April. This annual event is part of the Illinois Valley Striders

Grand Prix running circuit. For fourteen weeks, the planetarium conducted its *Basic Astronomy Series*, featuring a different hands-on lesson each week. The Cernan Earth and Space Center of Triton College welcomed Dr. Paul Sereno to its annual Big Event for members in April. Dr. Sereno has gained international notoriety in the pursuit of new dinosaurs. The Center will soon get a new tube for its laser projector, providing brighter and more colorful images. The William M. Staerkel Planetarium at Parkland College in Champaign is pleased to open a new original program in March called *Stellar Extremes*, starring University of Illinois astronomer Dr. You-Hua Chu. The planetarium recently hosted Girl Scout and Boy Scout astronomy merit badge workshops.

Indiana. In November, the Ball State University Planetarium presented their first program that used three video screens in place of the traditional slide projector screens. The effect was dramatic and well received by audiences. The PHM Planetarium & Air/Space Museum in Mishawaka held a laser show festival in March. In December 2004, then-U.S. Secretary of Education Rod Paige acknowledged the PHM School Corporation for its role in creating and promoting transit of Venus education programs. The E. C. Schouweiler Planetarium in Fort Wayne featured Cassini/Huygens as a special multimedia segment that immediately followed their traditional *Star of Bethlehem* show. The Schouweiler recently initiated public shows one weekend a month.

The Northrop High School Planetarium in Fort Wayne has acquired a new video data projector, so all their video sources are now projected widescreen. Their 5-meter radio telescope continues to take shape, but a number of additional steps and tweaks must be undertaken before the scope becomes operational. At the Muncie Community Schools Planetarium, students are learning about Chinese astronomy and have pen pals in China. A "Name the Warrior" contest is also under way, and a Han terra cotta five star general warrior from Xi'an, China also visited the planetarium.

Michigan. At the Dassault Systemes Planetarium in Detroit, Todd Slisher was recently promoted to the position of Director of Science Programs, while Jenny Pon was promoted to the position of Planetarium Manager. Work was completed on the *Blown Away: The Wild World of Weather* show kit. Special events included *Marsapalooza*, a workshop featuring researchers from the Mars Exploration Rover team, which drew planetarians from Indiana, Michigan, and Ohio.

The Shiras Planetarium in Marquette is enjoying their new MediaGlobe-Lite projection system. With it, they've witnessed their

school attendance tripling in the first three months they've been open. The staff also plans to team up with the local astronomy club for International Astronomy Day. The Robert T. Longway Planetarium in Flint recently hosted a series of public star parties. Their ever-popular Telescope Users Workshop was held in early April. Show bookings are on the rise at the Ensign Planetarium in Dearborn Heights as teachers are planning their spring schedules. The planetarium is now sporting a new *Wall of Constellations*, thanks to an incredibly talented sophomore, who has painted some beautiful renditions of their favorite star pictures on the back wall of the planetarium.

The Abrams Planetarium recently brought back the classic program *The Universe of Dr. Einstein*. The program was presented in honor of the World Year of Physics, so designated because 2005 marks the centennial of Albert Einstein's "miraculous year" of 1905. The Kalamazoo Valley Museum Planetarium recently ran an enhanced version of the McDonnell Planetarium's *The Little Star That Could* that features in-house produced 3D animations of Little Star and the other stars he meets. In May, their local community college hosted the Kalamazoo Animation Festival International, which featured a Digistar graphics competition.

The Cranbrook Institute of Science Planetarium in Bloomfield Hills ran a very successful Telescope Users Workshop in January for more than 50 new telescope owners. In February, they welcomed JPL's Nagin Cox, former engineer for the Mars Exploration Rovers and now with the Kepler Mission, for their new Science Series. At the Delta College Planetarium, February marked the eighth anniversary of the planetarium. The show titled *BIG* from The National Space Centre in England opened to help celebrate this milestone. The planetarium staff has produced a mini-show called *Celebrating Bay City* that will run before all public shows for the next year.

Ohio. Gene Zajac (Shaker Heights High School Planetarium) and Joe Marencik will once again offer their space bus summer camp this year. The space bus will participate in a one-week summer science camp at the Cuyahoga Valley Environmental Center. Zajac has also been helping Girl Scout troops to achieve their merit badges. The Ritter Planetarium-Brooks Observatory remains open and continues to offer programs. In 2003, they took a budget cut of \$115,000 and had to become self-supporting. Despite that, they're still presenting about 100 public programs, 40 scout shows, and 250 school programs per year.

Also in Toledo, Richard Shea is once again working in teacher mentoring and evaluation and plans to retire at the end of this

school year. In Columbus, the COSI Planetarium remains closed, but Director Mike Stanley has successfully embarked on a new career as a musician, providing a happy note to local nursing homes, senior citizens' residences, and pre-schools amidst a sad closure. At the BGSU Planetarium, their in-house program *Secret of the Star* lit up December skies for the fifteenth year. The "stargaze crew" who run observing sessions for the introductory astronomy courses is now up to a staff of ten.

Wisconsin/Minnesota. Todd DeZeeuw at the Gary Sampson Planetarium in Wauwatosa has finished a major upgrade with new projectors and automation from Ash Enterprises and ECCS. Nearby, Dave DeRemer is showing *Dark Matter* before the old Horwitz Planetarium goes completely dark to make way for a brand new Horwitz Planetarium, which will open in June. Bob Allen in LaCrosse is also running *Dark Matter* and continues his popular *Album Encounters* for university students.

Italian Planetaria's Friends Association

A national selection of scripts for planetarium shows will be organized by Italian Planetaria's Friends Association to improve the diffusion of the Eugenides contest, also in Italy. 31 August will be the final date to participate in the national selection. The best work, selected by an Italian committee, will receive as a prize the English translation of the text, necessary to participate to the International IPS Competition. The winner will also receive a yearly subscription to IPS, paid by IPFA. Other non-English countries might use this idea as a way to facilitate the diffusion of the Eugenides contest.

During this year's Day of Planetaria a national astronomical drawing contest for children was organized. The winners will receive telescopes as a prize. During the Day, in some planetaria, like the Crotona Planetarium in the south of Italy, many children participated in astronomical projects under the dome. The next "Day of Planetaria" will be held on 19 March 2006.

Milan Planetarium Ulrico Hoepli celebrated on 24 March the Jules Verne anniversary, and on 20 May the 75th anniversary of the foundation of the 20-meter dome. During this occasion, Fabio Peri, coordinator of the planetarium, presented the last news of the biggest Italian planetaria.

30 June will be the final date to participate in the IX issue of the International competition *Shadows of Time* for sundial makers, promoted also by Lumezzane Planetarium and Observatory in Brescia. More information, also in English, is available at www.ombredeltempo.it. The first Astronomical Festival will be held in the Brescia area in

June; for information check www.festivaldellastronomia.it.

Middle Atlantic Planetarium Society

Election results for the MAPS Board have been announced: Lee Ann Hennig, Alan Davenport, and Kevin Conod were re-elected for a two-year term.

The members of MAPS recently enjoyed a fruitful joint conference with SEPA at the Science Museum of Virginia in Richmond, Virginia. The 2005 MAPS gathering will be 25-28 May 2005 at the historic Fels Planetarium at the Franklin Institute in Philadelphia, Pennsylvania. Conference details are available on the MAPS web site at www.maps-planetarium.org.

The Fels was recently renovated and its new design optimizes the viewing experience. The recent renovations included replacement of the original 18,000 kilogram-plus, perforated stainless steel dome, built in 1933. The new Spitz premium seamless dome is lighter and is 18-meter (60 feet) in diameter. Other enhancements include upgraded video projection and super-fidelity systems, theater controls, lighting system, carpeting and theater seating, and ADA accessibility.

Nordic Planetarium Association

The planetarium in the AHHA science center in Tartu, Estonia, is working again in the old Observatory, and AHHA's StarLab planetarium has been booked a number of times. In March they had a science day in the local gymnasium (senior high school). The students were so interested in planetarium shows that this turned out to be the only science show that lasted for two days - in all there were 16 shows! Also they are busy organizing the new exhibition. This spring they are having many different workshops and science theatre shows, including planetarium shows. Therefore they have named it an activity-exhibition called "Spring in Observatory". Hopefully it will be a great success among visitors.

This year the Tampereen Planetarium in Finland had 93,000 visitors, which is a very good number for a 13-meter dome with 139 seats. Their three-channel partial dome video system designed in co-operation with Barco has been in operation since 2002, and it is working perfectly. They have been showing *Mars* produced by National Space

Center since last May. The next show, opening in May, is *Universe*, produced by Evans & Sutherland.

Tom Callen of Cosmonova Planetarium, Stockholm, Sweden, reports that the Swedish pseudoscience book (to which he has contributed fake UFO photos) now is published; for more information see www.leopoldforlag.se. The NPA conference 2005 takes place 16-18 September at the Orion Planetarium in Jels, Denmark, the southernmost planetarium in the Nordic region. The hosts encourage all NPA members and others with interests in the planetarium business in the Nordic and Baltic countries to join in for a good time. The conference will offer plenty of opportunities for talks, discussions, plane-



Orion Planetarium in Jels, Denmark, where this year's NPA Conference will take place in September. Photo: Lars Petersen.

tarium shows, a planned trip to Mediendom, Kiel, Germany, to experience their new facility and the Digistar 3 equipment, and a special cultural surprise under the dome at Saturday night. The registration fee is 120€ (90€ for students). More information on the conference program and a registration form can be found at www.orionplanetarium.dk, or contact Lars Petersen at orion@au.dk for further information.



Dinner with astronomers and public at the Independence Planetarium public event. Photo: Barbara Anderson of EditOne.

Pacific Planetarium Association

PPA president, Alan Gould writes that he has proposed to IPS to have a joint PPA/IPS membership at a discount. He continues, "Other regionals could have this option also." The advantage would be that PPA members could receive the benefits of IPS membership including the *Planetarian* journal as well as access to the "members-only" area of the IPS website which includes the *IPS Directory of Planetarians* all over the world plus the *Resource Directory*. Hopefully, IPS will allow this option in the coming year.

7-9 September 2005 is the next Western Alliance Conference of Planetarians in Colorado at the Denver Museum of Nature and Science. Dan Neafus at the Denver Planetarium is coordinator of the event. Participants will be able to experience the state-of-the-art all dome video system and a behind-the-scenes look at the system. The Alliance Journal/Newsletter is on the web at <http://rmpadomes.org/newsletter.html>. Advertisements, articles and newsbriefs are welcome to agould@berkeley.edu, web <http://lhs.berkeley.edu/sii>.

Andy Newton, director of the recently renovated J. Frederic Ching Planetarium at Harnell College in Salinas, California, reports that public show attendance has increased since the reopening of the planetarium. A new Konica Minolta Mediaglobe was installed. Newton says the Mediaglobe is so versatile and the public has been responding with sell-out evening public programs. In addition, astronomy and physics curriculum has increased in the NASA-CIPA (Curriculum Improvement Partnership Award) grant program. For more information contact Andy Newton at anewton@hartnell.edu.

In San Jose, California, the Independence Planetarium was the site for public talk by Leonard Tramiel. People were thrilled to be able to have the time to talk with the astronomers present. The next public event will be on 25 April when the planetarium will be celebrating the 15th anniversary of the Hubble Space Telescope. There will be an all day open house with planetarium programs, demonstrations, solar viewing, activities for families, students, and teachers. Information is available from Gail Chaid, chaidg@esuhsd.org.

The Independence Planetarium was again being threatened with closure. It happened in 1994 when

the district budget was a problem. Again, this year, because of a shortfall with the school district budget, the Board of Trustees put the planetarium on the list for closure. The 200 million dollar district budget has to be cut by approximately 10 million dollars so many items, including libraries, counselors, and advisors were all on the chopping block. In 1994 many members of IPS wrote to support keeping the planetarium open. Then it made a difference. Director, Gail Chaid with 34 years of teaching experience, received a pink-slip along with 935 other teachers out of 1200 total teachers in the district. Just before the *Planetarian* printing time, Chaid received a rescinding notice and it looks as if the district will continue supporting the Independence Planetarium. It always helps to have IPS and regional support in our planetarian community to keep planetariums open. Chaid thanks for your support in the past and for your continued encouragement for the future. For more information contact her or visit the planetarium website <http://planet.org>.

Russian Planetarium Association

One of the most important themes of RPA educational work this year is the 50th anniversary of the Baikonur Cosmodrome. Colleagues of Nizhny Novgorod planetarium and schoolchildren from the Nizhny Novgorod region have visited the largest Russian Space Center named in the honor of Hrunichev. This is one of the oldest Moscow enterprises, which always worked with the high technologies and which, since 1960, carried out projects and the building of large space-ships. The Proton rockets, the space station Salut, and the orbital complex Mir were all built here. Colleagues walked along the Mir station, saw the new rockets Angara and Baikal, and the many-goals laboratory module of the International Space Station (ISS) which will be launched in 2007.

Planetariums of RPA celebrated with interesting events the International Day of the Planetariums on 20 March 2005. In the Bryansk planetarium the Day this year was devoted to the 40-year celebration of the first space walk by A. Leonov. The mayor of the city of Bryansk, I.N. Tarusov, a citizen of honour of Bryansk space

pilot of USSR, Hero of the Soviet Union V.M. Afanas'ev, and poetess T. Artamonova were guests of the planetarium.

The science-artistic program *The pages of the cosmic century* was devoted to A. Leonov's space walk. Space pilot V. M. Afanas'ev took part in this program. The visitors of the planetarium had the unique opportunity to talk with the famous man who came from the same city, and to get autographs and souvenirs. The holiday ended with the show about Saturn and Titan. Unfortunately the evening sky was clouded, so visitors could see the ringed planet and Jupiter only on the starry dome of the planetarium. But anyway it was nice!

In Nizhny Novgorod The International Day of the Planetariums traditionally is the day of the new shows festival. This year the visitors could see several beautiful new programs: *Starry ABC for Neznaika* (Neznaika is a very popular hero of children's animated films), *Neznaika's journey to the Lord of*

Rings, The cosmic records, Saturn in the center of attention!, The Earth's landing on the Mars, and The Universe, Life, Intellect.

Building of the new planetarium in Tomsk goes on, and in Nizhny Novgorod construction starts this year. The next new building of planetariums will be in Yaroslavl. In 2004, the planetariums in Arzamas (Nizhny Novgorod region) and Uhta (Komi) were closed.

Southeastern Planetarium Association

The Sharpe Planetarium in Memphis recently announced their closure due to budget cuts from the City of Memphis. The planetarium had hosted the 1981 SEPA Conference and had been a leading institution in the planetarium community for several decades. The future of the planetarium is unknown. On a more positive note, Bradenton's Bishop Planetarium is scheduled to reopen sometime in the summer of 2005.

The planetarium has been closed since a devastating fire destroyed the facility in the summer of 2001. Former Fernbank Planetarium staffer John Burgess recently came out of retirement to act as interim director of the planetarium in Young Harris, Georgia. Burgess was with the Fernbank for many years and was instrumental in helping organize several SEPA conferences back in the 1970s as well as hosting the 1974 Atlanta ISPE conference.

The 2005 SEPA Conference takes place at Fernbank Science Center 14-18 June 2005. The theme is Astronomy Education, and the mode is "very casual". They are planning paper sessions and workshops for planetarians, and a special break-out session on Thursday morning 16 June for planetarium artists. The exhibit staff at Fernbank will host that session, which is limited to 10-15 people. The conference hotel is the Holiday Inn in Decatur. At 6:30, buses take conferees to Fernbank Science Center for an opening reception, Sky Tellers planetarium program written and produced in-house by Ed Albin, and planetarium open house. Weather permitting, the observatory will be open as well.

Conference attendees are fortunate to have three Zeiss planetariums in proximity and will be spending a day at each one. Wednesday they will go to



Nizhny Novgorod schoolchildren, teachers, and employees of the planetarium before departure from the Hrunichev Cosmic Center. Photo: V. Zharinov.



The accelerator "Baikal" in the assembling workshop of The Cosmic Center named in the honour of Hrunichev, Moscow. Photo: V. Zharinov.

Emory University for morning paper sessions, afternoon workshops/paper sessions, and a speaker from Georgia's astronomy community. At 7 p.m., Jon Bell will host the Constellation Shoot-out. Delegates can tour the observatory and dome-crawl as well. Thursday will be spent at Fernbank, starting with the family planetarium program *Cosmic Game Show*, written and produced in-house by Dave Dundee, followed by workshops and paper sessions.

Friday will be spent at beautiful Agnes Scott College, starting with the SEPA business meeting followed by lunch and a speaker. StarLab and other workshops will be in the afternoon. Saturday are the last paper sessions and door prizes. There will be a pre-conference trip to Young Harris College in the lovely (and cool) North Georgia mountains. Ken Miller is hosting a trip up to see the GOTO Chronos projector and theater. There is also a post-conference trip - anyone is welcome to drive down to Macon to visit Toby Click's planetarium at the Arts and Science Museum.

The Astronaut Memorial Planetarium in Cocoa, Florida will host the 2006 SEPA Conference. Director Mark Howard and staff are already working on conference details and will have information available later in the year. Further information regarding SEPA is available at the website sepadomes.org.

Southwestern Association of Planetariums

John Peterson and Corey Stone have succeeded in making El Paso the first city in Texas to pass a city zoning ordinance to control light pollution! After ten years of speaking at city hall, giving presentations to neighborhood associations, various community groups, and eventually a room full of assistant police chiefs, their message finally made it through. This ordinance, inspired by a visit from John Dobson back in 1994, was finally passed on 8 February 2005, and will go into effect on 7 May. The planetarium is a way to create the nighttime sky, but nothing beats the real thing. Unfortunately, in many places across the country, trying to see more than just a few constellations will pose quite a challenge. Light pollution has been a topic of concern for many years. Tony Butterfield has given several presentations to Houston city council members detailing all of the economic benefits and safety advantages to proper lighting, but not yet succeeded.

After returning from Christmas Holidays Donna Pierce, Director of the Highland Park Planetarium in Dallas, took the Academic Decathlon students and their sponsors for three days of astronomy at the McDonald Observatory on Mount Locke in Fort Davis. The students had been coming to the planetarium for one period a week the first

semester to study for their Super Quiz on Astronomy. Astronomy workshops at the Visitor's Center with Education Coordinator Marc Wetzel and lecture with research astronomer Dr. Stephen Odewahn, plus tours of the 76-cm, 91-cm, 208-cm and 277-cm telescopes and behind the scene time at the Hobby Eberly Telescope and including night Star Parties and Twilight Programs on the mountain gave the students background information and hands-on astronomy to blast the competition at the U. I. L. District Academic Decathlon Contest.

The Highland Park High School AcDec students won all three places in all levels at competition coming home with 39 medals! Pierce was in tears when they presented her with one of their medals. Making certain the students were up before sunrise to see all the visible planets on the horizon each morning, she did give them a break taking a trail ride at Prude Ranch after lunch one day. Pierce admits she probably astronomied them out - but what a time with all three nights of clear skies!

On 16 April the newest planetarium in Texas will open in Laredo. The new Digistar 3 theater will open with two shows from the Clarke Planetarium for public and school groups. Their Mission: outreach to public schools, education of the community, and entertainment.

The multi-year Immersive Earth grant is now moving into its next stage of research. Rice University and the Houston Museum of Natural Science have spent the past year developing a low cost portable planetarium to improve educational outreach in underserved areas. A training session at the Houston Museum of Natural Science in January will now allow for the other grant partners to start offering outreach fieldtrips in four more locations: Portland, Albuquerque, Baton Rouge, Pittsburgh, and the Houston area. The first of three shows funded by the grant opened in March, titled *Earth's Wild Ride*.

Calendar of events 2005

- 10-12 June. European collaborative for science, industry and technology exhibitions (ECSITE) Annual Conference, Heureka, Vantaa (Helsinki), Finland. <http://www.ecsite.net>
- 14-17 June. Communicating Astronomy with the Public, ESO/ESA/IAU Conference, ESO HQ, Garching, Munich, Germany. Closing date for registration March 2005. <http://www.communicatingastronomy.org/index.html>
- 14-18 June. South Eastern Planetarium Association Conference, Fernbank Science Center, Atlanta, Georgia, USA. See <http://www.sepadomes.org/conference/>

- 12-14 July. Japan Planetarium Society Conference, Osaka Science Museum, Japan.
- 15-17 July. DomeFest2005. <http://www.domefest.com/2005.html>.
- 18-21 July. Spitz Digital Institute, Chadds Ford, Pennsylvania (USA). The Institute will focus on using software to enhance education in both the classroom and the planetarium. http://www.spitzinc.com/digital_institute/index.html. Space is limited.
- 24 July to 6 August. The College of the Atlantic in Bar Harbor, Maine (USA), offers a two-week, four-credit residential summer institute for teachers that includes a course on instruction using a portable planetarium and information about grant writing for participants to acquire a portable planetarium. contact person: Jean Boddy, (800) 597-9500. <http://www.coa.edu/summer/sumworkshops/index.html>.
- 31 August. Deadline for the applicants of A week in Italy for a French Planetarium Operator. http://www.colibrionline.it/MG/international_collaboration.htm
- 7-9 September. Western Alliance Conference of Planetariums (RMPA, PPA, GPPA, SWAP), Denver Museum of Nature & Science, Gates Planetarium & Space Odyssey exhibition, Colorado, USA. vonahnenkarl@fhda.edu
- 14-16 September. Building Community: The Emerging Educational and Public Outreach (EPO) Profession, as part of ASP's 117th Annual Meeting in Tucson, Arizona, USA. <http://astrosociety.org/events/meeting.html>
- 16-18 September. Nordic Planetarium Association Conference (NPA), Orion Planetarium, Jels, Denmark. www.orionplanetarium.dk
- 24-25 September. International Planetarium Society Council Meeting, Beijing Planetarium, Beijing, China. Martin.George@qvmag.tas.gov.au
- 30 September. Deadline for the applicants of A week in Italy for a Spanish Planetarium Operator. http://www.colibrionline.it/MG/international_collaboration.htm
- 9 October. XX National Meeting of Italian Planetaria, Brescia, Italy. http://www.colibrionline.it/MG/planetaria_news.htm
- 15-18 October. Association of Science-Technology Centers (ASTC) Annual Conference and Expo, Science Museum of Virginia, Richmond, USA. <http://www.astc.org>
- 17-23 October. A week in Italy for an American Planetarium Operator (each year since 1995). <http://www.bresciascienza.it/cityline/cult/photog.htm>
- 19-22 October. Great Lakes Planetarium Association Annual Conference, Public Museum of Grand Rapids, Grand Rapids, Michigan, USA. Contact: David DeBruyn

www.grmuseum.org/chaffeeplanetarium/chaffee.shtml www.glpaweb.org/conference.htm

31 December. Deadline of Eugenides Foundation Scriptwriting Contest (contestants can submit scripts from 1 July 2005). For more information: stidey@sabreshockey.com.

2006

19 March. International Day of Planetaria. www.planetaritaliani
 8-10 June. European collaborative for science, industry and technology exhibitions (ECSITE) Annual Conference, Technopolis, Mechelen, Belgium. <http://www.ecsite.net>
 24-27 July. Under the Southern Skies, 18th International Planetarium Society Conference, Crown Promenade, Melbourne, Australia. www.ips2006.com.
 25-28 October. Great Lakes Planetarium Association Annual Conference, Merrillville Community Planetarium, Merrillville, Indiana, USA. gwilliam@mvs.k12.in.us, www.ncpstars.org, www.glpaweb.org/conference.htm.
 28-31 October. Association of Science-Technology Centers Annual Conference and Expo, Louisville Science Center, Louisville, Kentucky, USA. <http://www.astc.org>.

2007

10-14 October. Triple Conjunction Planetarium Conference with the Mid-Atlantic Planetarium Society, South Eastern Planetarium Association and Great Lakes Planetarium Association. Host: Benedum Planetarium, Benedum Natural Science Center, Oglebay Resort, Wheeling, West Virginia, USA. smitch@oglebay-resort.com, www.oglebay-resort.com/goodzoo/planetarium.htm, www.glpaweb.org/conference.htm. ☆

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What did we do before the Internet? With just a few key strokes and quick connection to the Internet I can visit planetaria far and wide. Just the other day I paid a visit to **Planetario de Bogotá**, Colombia, www.planetario-debogota.gov.co. I do like to stay in touch with all of you reading this column and I've had many opportunities to stay in your lives, even if only from afar - I find comfort in staying connected. I've always enjoyed reading the news of other planetarians in this journal over the years. I've had the opportunity to join a number of the various regional planetarium associations and I have always found it a treat to find their newsletters in my mailbox. I even try to follow the various threads on Dome-L. Lately it seems that the topic of belief has found its way into more than a few of the online discussions. With the passing of **Pope John Paul II**, the public display of devotion to one person is testimony that many people want a spiritual leader. Reports in the media relate that people who went to see the Pope felt a connection to him - they felt that even in a crowd of a million pilgrims - that he was speaking directly to them. The Vatican has

an observatory and I can remember a council meeting there some years ago. Vatican astronomers also observe under the clear skies of Arizona. Enjoyment of the sky and the search to understand its mysteries are universal quests for human beings. The debate in the press and on Dome-L about religion vs. science has to be one of the most heated discussions of the year. We regularly discuss other cultures and beliefs in our shows so it seems like a planetarium is a natural place for these discussions to occur. Regardless of what you believe in, please take a moment to join me in sending ...

Our condolences ...

... to the friends and family **John Ebdon**, former planetarium director of the **London Planetarium** and broadcaster whose legendary voice and wit made him a treasure to millions of viewers and listeners. He passed away on March 19, 2005, at the age of 81. His 21-year association with the London Planetarium began in 1968.

And our congratulations ...

... to Planetarium Director **Jeannette Lawler** on the installation of a new **Zeiss Sky-master ZKP3/B** inside the newly renovated **Brigham Young University Planetarium** in Provo, Utah! Reopened this past March, the 119-seat theater replaces a smaller 43-seat facility built in the same location back in 1958.

... to **Holden Thorp**, former **Morehead Planetarium** director, on his promotion to the position of Chairman of the Department of Chemistry at the **University of North Carolina**. During his time as director he strengthened the role of the planetarium and adjacent science center in the community, resulting in a 40% increase in visitors. Thorp will begin his new role in July. The search for a replacement for Thorp is ongoing.

... to **El Camino College** in Torrance, California, on the unveiling of a new, state-of-the-art projector for the astronomy department's planetarium. Taking center stage will be a **GOTO Chronos Projector** paid for with funds from the Measure E facilities bond.

... to long time planetarians **John and Prue Schran** who announce the birth of their daughter **Mary Campbell Schran**, born March 22nd in West Chester, Pennsylvania. All are doing well! John is with **SPITZ, Inc.** in Chadds Ford, Pennsylvania, and Prue is from **West Chester University Planetarium** in West Chester.

... to **Jeff Bass** (Vice President of Education, Public Programs and Imax) and the **Milwaukee Public Museum** on their renovation plans for their IMAX dome, soon to become



When planetarians get together, beautiful things happen. Mary Campbell Schran, the newest "Star" in the planetarian family! Photo courtesy of John and Prue Schran.

the **Humphrey IMAX Dome Theater and Daniel M. Soref Planetarium**. Set to open January 2006, the planetarium, featuring a 22.5-m (74-ft) dome, will be the largest in Wisconsin. The Museum has selected **Evans & Sutherland's Digistar 3 Laser** for their \$2.6 million renovation.

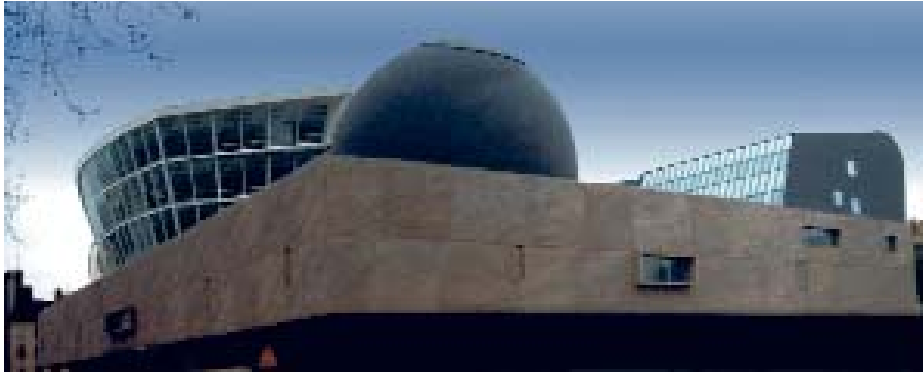
... to the team of the **Hubble Space Telescope** on their 15th Anniversary!

... on the occasion of the 75th anniversary of the **Adler Planetarium** in Chicago, Illinois. The planetarium begins a yearlong celebration beginning May 12, 2005! **Astronaut James Lovell** recently donated many of his personal space mementos as a gift in honor of the anniversary. He credits visits to the Adler in his teens as the inspiration for his aeronautical achievements. Working from a public mandate for more inspirational programming, the first US planetarium plans to include a bronze statue of Lovell as a part of the anniversary upgrades. Exhibitions of space-flown hardware and dramatic new shows featuring moon-landing simulations will also be featured this year. Earlier in the year, Adler announced a major award of **NASA** support for the outreach efforts on the **IBEX Mission** educational initiatives. For more info go to www.adlerplanetarium.org/pressroom/archive.shtml.

... to the launch of the planetarium project at **Metropole Rennes** in Rennes, France! The recently announced project will utilize a **DigitalSky** full dome video system, digital sound, theater lighting, and pre-show area systems, all controlled by a single integrated SPICE system from Sky-Skan, Inc.

... to **Yves Camard**, Directeur du Planetarium at **Cite des Sciences et de l'Industrie** in Paris, France, on the occasion of his retirement.

... to **Shigeru (Shu) Tanaka**, the new Director of **Konica Minolta Planetarium Co. Ltd.** in Mahwah, and Ramsay, New Jersey! Mr. Tanaka has provided 33 years of service to Konica Minolta, first in its Camera Division and for the past 12 years with the Plane-



An artist's rendering of the new planetarium project for the Metropole Rennes in Rennes, France. Photo provided by Metropole Rennes via Sky-Skan, Inc.



On his way to the USA, Mr Shigeru (Shu) Tanaka is the new Director of the Konica Minolta Planetarium Co., Ltd. Photo courtesy of Mr. Tanaka.

tarium Division. Be sure to say hello to Shu when you see him at an upcoming conference. You may reach him via email at stanaka@ph.konicaminolta.us or by phone at 201-574-4192. Mr. Tanaka will take over for **Mr. Shigeki (Shiga) Ogawa** who has taken on a new assignment for Konica Minolta Planetarium in Japan. Good Luck to you both!

In the year 2081 ...

Researchers from the **Rice Space Institute**, in partnership the **Houston Museum of Natural Science**, are leading a NASA-funded project to develop portable technology that will allow exciting new "fully immersive" planetarium programs to be shown across the country inside inflatable, classroom-sized domes. *Immersive Earth* is a five-year, \$3.1 million project that brings together six museums, two universities, and three companies to create and distribute full-dome digital planetarium shows nationwide. *Immersive Earth* aims for a wider audience through the development of a small, fully portable system that uses an inflatable dome and single-projector display. The *Immersive Earth* grant will also pay for the creation of three new programs: "*Earth's Wild Ride*, which takes place in the year 2081, is now available; *Earth in the Balance*; and *Earth in Peril*.

Other participants in the program include both the **Carnegie Museum of Natural History and Carnegie Mellon University** in Pittsburgh, the **Lodestar Planetarium** in Albuquerque, the **Oregon Museum of Science and Industry** in Portland, the **Louisiana Arts and Science Center** in Baton Rouge, and the **Smithsonian Museum of Natural History** in Washington, D.C., **Sky-Skan Inc.**, **Homerun Pictures Inc.** and **iMove Inc.** Recently, **Space Update Inc.** and **Elumenati** joined the list of participants to the project. For more information or to schedule a performance of this technology visit <http://www.e-planetarium.com>. See the front cover for a graphic from the program.

Did you know ...

... that the **Palouse Discovery Science Center** in Pullman, Washington, recently celebrated the grand opening of its new planetarium? Through the efforts of **Paul Allan** (former president of the Board of Directors) and funded by grants from the **Bill and Melinda Gates Foundation** and **Foundation Northwest**, the center now utilizes a Digitalis Digitarium Alpha from Digitalis Education Solutions, Inc. of Bermerton, Washington (<http://digitaliseducation.com>).

... that the **Fels Planetarium** was recently the subject of a **Discover Magazine** article (May 2005) that is also available for viewing online <http://www.discover.com/issues/may-05/departments/reviews>.

... that **The Molecularium** show, *Riding Snowflakes*, is designed to bring to life atoms and molecules as characters that can bond together in order to make all the materials in the universe? Funded by the National Science Foundation and created by the **Rensselaer Polytechnic Institute's Nanoscale Science and Engineering Center for Directed Assembly of Nanostructures**, the show is presented in the new digital dome theater at the **Children's Museum of Science and Technology** in Troy, New York. During the program, the audience is introduced to oxygen, hydrogen, and carbon through the engaging characters "Oxy", "Hydro", "Hydra", and

"Carbón", who travel in a marvelous spaceship (also named Molecularium) guided by "Mel" (an advanced computer system). The journey takes them to visit clouds, raindrops, the ocean, and space. They find a snowflake - and take an exciting ride into its structure. Explore this micromarvelous universe at www.molecularium.rpi.edu.

... that you can now talk to aliens? According to a group calling them selves the avionics members of the **Civilian Space eXploration Team (CSXT)**, you can. A visit to their website www.TalkToAliens.com provides all the details. Phone and email messages are sent through "The World's First Intergalactic Communication System." Could this be the next "Buy a Star" thread on Dome-L? The CSXT is also the same team who launched the world's first private / amateur rocket into space last spring. For those details, visit: www.civilianspace.com. Soon you'll be able to IM ET a CU from your MiniDV!

... that with the 2006 conference just a little more than one year away, **Melbourne Planetarium** at the Scienceworks Museum in Melbourne, Australia, is busy at work remodeling their 6-year-old facility? In mid-2005, the Planetarium will replace its existing star projector with DigitalSky from Sky-Skan, Inc. The Melbourne Planetarium has a strong history of producing high-quality shows in-house so we're sure to be in for some fun and surprises when we all convene in Spotswood! New show production on the new system is already underway. Not only are the visual systems being redone, but the staff of the 16-m (52-ft) dome will now have "no worries" about replacing pesky light bulbs in the cove due to the new LED cove lighting system. With a rated life of 100,000 hours and the ability to provide over 16 million color combinations, LED cove lighting is another welcome change, allowing the staff to focus on what they do best - entertaining astronomy education.

... that **Bishop Planetarium** at the **South Florida Museum** (Bradenton, Florida) is on the mend after a devastating fire closed the facility three and a half years ago? Astronomy buff and consultant Pete Hill was recently named Planetarium Manager. The facility will reopen later this year with a real-time digital planetarium and 3D graphics system from Sky-Skan, Inc. of Nashua, New Hampshire.

... that **Chabot Space and Science Center** has a traditional show with slides and video called *Dragon Skies: Astronomy of Imperial China*? It was produced last year to accompany their traveling exhibit of the same name (www.dragonskies.org) The program is also available on its own without the exhibit. The story involves the boy emperor who is reluctantly learning astronomy, and the Azure Dragon, who is a beautifully animated

video piece. If anyone wants more information, send at note to rdduck@chabotspace.org. Chabot also plans to add a DigitalSky from Sky-Skan, Inc., to their 240-seat, 21.3-m (70-ft) theater experience later this year.

... that due to city budget cuts, the **Sharpe Planetarium** in Memphis, Tennessee, was set to close in March of this year? You can send a letter of support via the local newspaper on their website at <http://web.commercialapeal.com/newgo/forms/letters.htm>. For updates on the status of the Sharpe visit www.memphismuseums.org.

... that **Los Angeles Valley College** in Van Nuys, California, replaced its original Spitz A3P optical projection instrument, installed in 1966? The intimate 7.3-m (24-ft) dome, 50-seat theater acts as both planetarium and astronomy classroom for the college. LA Valley College installed a Macintosh-based **SciDome** system as required by the college's specification to provide a common platform for content creation by other campus disciplines. Funding was provided by a NASA Curriculum Improvement Partnership Award Grant.

... that West Nyack, New York, has a new digital planetarium? The new **Clarkstown High School Planetarium** installed a 9.1-m (30-ft) Spitz dome, a **System A5 instrument**, and an ATM-4 automation system last year. Assistant Principal **Paul Guglielmo** and his staff require compelling, pre-recorded planetarium shows to enhance their regular optomechanical presentations. SciDome was added at the end of 2004 to play full-dome shows and provide multimedia capability with digital slides and movies.

... that Harrisburg, the Pennsylvania state capitol and home of the **State Museum of Pennsylvania** is home to a 9-m (30-ft), 90 seat planetarium first opened in 1965? The Spitz A3P instrument was replaced in February by a digital SciDome system with **Starry Night Dome** software and **Nomad** controller.

Stay connected ...

to the **ITALIAN PLANETARIA'S FRIENDS ASSOCIATION**, online at http://www.colibrionline.it/MG/international_collaboration.htm.

to India's 18th-century observatories on the web at <http://www.jantarmantar.org>. This is a multimedia project about the astronomical observatories built in India in the early 1700s by Jai Singh, Maharajah of Jaipur. Commonly known as "Jantar Mantar," the observatory sites (four of the original five observatories still exist) feature large-scale architectural structures that function as sight-observation instruments. The project is a creation of Cornell University Professor of Art, **Barry Perlus**. He would love to get your input and feedback on the website. Contact him at bap8@cornell.edu.

to **Jim Hooks** (former IPS president from 1979 to 1980 and one of the founders of SEPA). Here is a note from Jim posted on Dome-L. "Where Have I been? January 29, 2005 - It was an honor for me to be with the St. Phillips Episcopal Church of Charleston, South Carolina, and be a contributor and helper for a Medical Mission Trip to Honduras, Central America. The outside temperature was 28 degrees F. and winds blowing from the north at 15 miles per hour. It was bitter cold. There was new construction at the airport. As I drove away my son-in-law, Jon Halford ran after me yelling for me to stop. Yet the heater in auto was at full, and the windows up and I did not notice him. I did not notice a shuttle bus stop. It did not seem to be far from the main terminal building. Yet, as I locked the auto and started to leave I noticed that I had left an important large bag with glasses, medical supplies, and clothes. It was heavy. It must be said here that I was not prepared for the weather, because I had checked the Honduran weather and it was 82 degrees F. and low of 65 and therefore I did not wear a heavy coat. I started to walk and I noticed that the walkway was leading to the left and was going around a large work area, it was not level and was plywood in places. I was getting colder and my lungs were beginning to hurt from the cold air. I thought that I must get to the terminal building quickly my body was freezing. The distance was 3/4 mile and it was almost overwhelming. I finally came to the building and looked for my daughter Heather. She thought that I had taken the shuttle back and I was almost exhausted and bitter cold; after talking with her my heart went into ventricular tachycardia, and that lead into atrial fibrillation, and then cardiac arrest. I passed out, and fell back to the concrete floor. I was a lucky man. Heather started CPR ambitiously and was followed by Jon Halford and two other doctors. The airport had an "ACD" (automatic cardiac defibrillator) Dr. Halford applied it and my heart was started again. As I came back to life, I felt that it was a bad dream. I hope and pray that I did not receive any brain damage! Based on the CT scan my skull was not damaged. I did damage my equilibrium and am now on the mend for that - I hope. My hospital stay - Jan. 29 - Feb. 4, 2005 results: (A) no heart attack, (B) heart rhythm is back to somewhat normal, and (C) the echocardiogram indicated good flow. Looking back - it is too late to consider all the mistakes that I made! What can happen will happen. An Angel was looking over me! God must have something for me to do!" Send Jim Get Well Wishes via email at JamesAHooks@aol.com.

Not to lessen the severity of Jim's ordeal, but I had a very similar experience when they made us walk down from the Alpine

Bar-B-Cue at the IPS conference at Snowbird in Salt Lake City in 1992!

And finally,

We all share our beliefs with others every time we do a show. We are storytellers and educators and inside our "cathedrals to the stars" we artfully and scientifically get to display the wonders of nature. We often use words to describe the awe and beauty of the Universe - words like glory and majesty - words that evoke rulers and kings, lords and leaders. We are entrusted with a powerful tool. With that power comes responsibilities. Let's make sure we make the best use of these planetaria everyday. To quote **Max Adler**, benefactor of the Adler Planetarium, "The planetarium was built to emphasize that all mankind - rich and poor, powerful and weak - as well as all nations, constitute part of one universe." Let's give people a reason to believe, in science and in each other and in this great common connection that is our Universe, however it all began. Anyone who attended the side trip to the **Kansas Cosmo-sphere and Space Center** during the 2002 IPS conference is aware of the power to make something great out in the middle of where you would least expect it. The recent controversy at that museum is a matter near and dear to the hearts of all who read this journal. Rather than reporting on the matter I'll let the Internet lead you to the full text of the indictment at the US Department of Justice website at <http://www.usdoj.gov/usao/ks/press/apr2005/april7b.pdf>. You can form your own beliefs about what's transpired. Inquiries regarding the details of this case should be directed to **Jim Cross** at the United States Attorney's Office, Wichita. Mr. Cross can be reached at 316-269-6481. Contributions to future editions of the Gibbous Gazette can be directed to me at the address at the beginning of this column. Thank you! ☆

(Digital, continued from page 44)

nature of your full-dome experience, and related areas of interest. Please also indicate any ideas/preferences you have for the formation of subcommittees. Possible subcommittees include portable planetarium, standards and guidelines, show production and distribution, website and communications and awards subcommittee.

Also if you are in an IPS committee that overlaps ours a bit (media distribution, portable planetarium, planetarium development, etc.) and are interested in acting as a liaison to the full-dome committee, we would appreciate hearing from you.

I appreciate this opportunity to serve the planetarium community and look forward to receiving your feedback! ☆

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— Jim Manning, Taylor Planetarium, Museum of the Rockies, and Associate Editor, *The Planetarium*

"I imagine that it's one of the few tabletop experiments about which, 200 years from now, they will say 'that's back when they made clever, quality instruments.'"

— Dr. Neil de Grasse Tyson, Astrophysicist and Director, Hayden Planetarium, American Museum of Natural History



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Last Light



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april.whitt@fernbank.edu

Greetings of the solstice, dear friends. This quarter's column includes submissions from planetarium stars, and continues the celebration of the Einstein Centennial.

One of our favourite Brits, Steve Tidey, shares more of his "Planetarium Show Titles That Never Made It":

1. The Space Race: And The Soviet Union Have Got Off To An Explosive Start, Leaving The USA On The Blocks, Oh, Drama, The Soviets Have Pulled A Hamstring. Here Come The Americans Zooming Past On The Inside, And They Reach The Moon First. (Allegedly).
2. Einstein Simplified In Twenty Easy Equations.
3. Saturn: Counting All The Particles In The Rings.
4. Asteroids: Aaaargh! Run For Your Lives!
5. Star Naming: Don't Come Here Expecting Us To Do It For You.
6. Pluto: Yes, It's A Planet. Next Question?

Hopefully by the time you read this, the Space Shuttle will be flying safely again. I had heard about railroads and wagons built on ancient specifications, but hadn't realized that the U.S. space program is influenced by history as well. Thanks to Jane Hastings for sending this.

The US standard railroad gauge (distance between the

rails) is 4 feet, 8.5 inches.

That's an exceedingly odd number. Why was that gauge used?

Because that's the way they built them in England.

Why did the English build them like that?

Because the first rail lines were built by the same people who built the pre-railroad tramways, and that's the gauge they used.

Why did "they" use that gauge then?

Because the people who built the tramways used the same jigs and tools that they used for building wagons, which used that wheel spacing.

Okay! Why did the wagons have that particular odd wheel spacing?

Well, if they tried to use any other spacing, the wagon wheels would break on some of the old, long distance roads in England, because that's the spacing of the wheel ruts.

So who built those old rutted roads?

Imperial Rome built the first long distance roads in Europe (and England) for their legions. The roads have been used ever since.

And the ruts in the roads?

Roman war chariots formed the initial ruts, which everyone else had to match for fear of destroying their wagon wheels. Since the chariots were made for Imperial Rome, they were all alike in the matter of wheel spacing. The United States standard railroad gauge of 4 feet, 8.5 inches is derived from the original specifications for an Imperial Roman war chariot.

So the next time you are handed a specification and wonder what horse's a** came up with it, you may be exactly right, because the Imperial Roman army chariots were made just wide enough to accommodate the back ends of two war horses.

Now the twist to the story

When you see a Space Shuttle sitting on its

launch pad, there are two big booster rockets attached to the sides of the main fuel tank. These are solid rocket boosters, or SRBs.

The SRBs are made by Thiokol at their factory in Utah. The engineers who designed the SRBs would have preferred to make them a bit fatter, but the SRBs had to be shipped by train from the factory to the launch site. The railroad line from the factory happens to run through a tunnel in the mountains. The SRBs had to fit through that tunnel. The tunnel is slightly wider than the railroad track, and the railroad track, as you now know, is about as wide as two horses' behinds.

So, a major Space Shuttle design feature of what is arguably the world's most advanced transportation system was determined over two thousand years ago by the width of a horse's back end.

A haiku from a computer screen:

Out of memory.
We wish to hold the whole sky,
But we never will.

And in honor of this hundredth anniversary of Einstein's Theory of Relativity, a few more of my favorite quotes of his:

The most incomprehensible thing about the world is that it is comprehensible.

The important thing is not to stop questioning. Curiosity has its own reason for existing.

If A is a success in life, then A equals x plus y plus z. Work is x; y is play; and z is keeping your mouth shut.

Two things are infinite: the universe and human stupidity; and I'm not sure about the universe.

The most beautiful thing we can experience is the mysterious. It is the source of all true art and all science. He to whom this emotion is a stranger, who can no longer pause to wonder and stand rapt in awe, is as good as dead: his eyes are closed.

You see, wire telegraph is a kind of a very, very long cat. You pull his tail in New York and his head is meowing in Los Angeles. Do you understand this? And radio operates exactly the same way: you send signals here, they receive them there. The only difference is that there is no cat.

Not everything that counts can be counted, and not everything that can be counted counts.



Aboard the International Space Station, Expedition 10 Commander Leroy Chiao used a digital camera April 6 to photograph the rollout of the Space Shuttle Discovery at NASA's Kennedy Space Center from an altitude of 355 kilometers. Chiao captured the rollout at 4:35 p.m. Eastern Daylight Time, 6 April 2005, as the Station flew directly over the launch site. Visible in the image are the Shuttle's two launch pads at Launch Complex 39. Discovery's launch pad, 39-B, is on the left. Photo credit - NASA

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