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On the Cover: A last look at Chicago and its famous skyline. Denis James from Texas patiently waited and captured this spectacular image during IPS 2008.
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All these things will be accomplished by the simple words “convert planetarium.”

For anyone who works in and around educational systems—and that’s most of us—it’s pretty obvious that there was a private agenda at work that needed the planetarium’s space and no arguments, show of support, or call to common sense would have prevailed.

I hope Gail will remain active with the IPS and her regional groups. We value her experience and ability too much to let her slip away into the night.

On the Move

Another loss, in a way, is the new job now held by John Stokes. I think we took John for granted at the Space Telescope Science Institute, knowing he was our very own connection to the mighty Hubble Space Telescope.

I know he’ll do just as great a job at the National Radio Astronomy Observatory, where he’s the new education and public outreach officer for ALMA, the Atacama Large Millimeter/Submillimeter Array. For more about this new telescope array and the European IYA program based on its science, check out the story by Agnès Acker and Henri Boffin on page 16.

Sometimes it’s just coincidence: on Facebook I learned that Brock Schroeder, formerly at Strickler Planetarium and Observatory at Olivet Nazarene University in Bourbonnais, Illinois, is the new vice president of Enrollment and Marketing at Malone College in Canton, Ohio. He’s a neighbor now; Canton is about 50 miles away from Youngstown.

I had noticed in Susan Button’s President’s Message that Brock had stepped down from being chair of the Education Committee and now I know why. It’s too bad he’s leaving the planetarium field, but for a chance to step up to a vice president’s position, we’ll forgive him and wish him luck. His new position involves work with admissions, retention, financial aid, marketing, and web content management. After running a planetarium, he shouldn’t have a problem handling all those duties.

Steve Case is the new Strickler director, and the Olivet alumni returned just in time to see four months of renovations completed. A new Digistar 3 SP2 HD is now in use.

On another people note, Martin Ratcliffe, former IPS president, has a new book out called State of the Universe 2008. I’m sure that April Whitt will have it soon in her Reviews column, but if you can’t wait, it’s available from publisher Springer’s website at springer.com.

Virtual Professional Development

One of the problems we planetarians face is finding the time for professional development. I’ll tell you a secret: I’m doing it right now. While I’m typing I’m also listening to planet-finder Dr. Geoff Marcy discuss the fact that we know that the laws of physics, chemistry, and math apply to the rest of the universe, but we’re clueless when it comes to the principles of biology. Looking for life elsewhere, then, is a tough job.

You, too, can take advantage of talks from world-famous astronomers and scientists by going to the Astronomical Society of the Pacific’s archive of the Silicon Valley Astronomy Lectures, six of which are presented during the school year at Foothill College in Los Altos Hills, California. And yes, Foothill College should ring a bell because that’s the home of Dr. Andrew Fraknoi, the guru of astronomy education.

If you missed Dr. Janice Voss’ talk at IPS 2008, you can link to her talk on “A Scientist in Space” and the Kepler mission at the site.

Go to www.astrofoundation.org/education/podcast/index.html for the links and a complete list of talks.

Keeping the Kids Busy

I sometimes have people arrive for planetarium programs very early—as much as an hour before the start time. I suggest that they could spend some time next door at the Butler Institute of American Art, but if they’re content to sit and wait, what do you do—especially if there are children?

Mom experience had the answer for this one. I have a huge tub of crayons (that I replace each year when WalMart has them on sale) and a number of astronomy-related coloring sheets set out before each program. Because my dome is also a classroom there are desk arms on the seats, so I take full advantage and give the kids something to do.

My favorite source of coloring sheets is NASA/JPL’s Space Place, which provides pdf files free for the downloading. Space Place has the services of a cool artist who draws delightful things for kids (I’m a big fan of his “big nosed” planet characters) and I’ve been lobbying them for drawings of the planets. Maybe if we all email Nancy Leon at nancy.j.leon@jpl.nasa.gov and show enormous support for the Space Place site—which we should be doing anyway—she’ll be able to swing them for us.

While you’re there (spaceplace.nasa.gov), check out their new downloadable book called Lucy’s Planet Hunt, and be sure to get the Lucy coloring sheet. The teacher’s section has simple classroom demos and the site is just full of fun things to learn and do.

That’s all I have room for this issue. If anyone is interested in filling in for James, please let me know. You certainly don’t want to be subjected to my ramblings for very long, and I don’t need another hat to wear!
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Abstract. This paper presents an introduction to what’s involved in creating, promoting and successfully distributing a pre-rendered fulldome show. We’ll look at the business case for producing an original show (nearly 100 titles are currently available or in development), including an overview of “typical” show production costs and development cycles, creative and technology requirements, realistic distribution/revenue expectations and average license fees for a range of theatre types. Several recent partnerships and collaborative productions, including The Zula Patrol: Under the Weather and Black Holes: the Other Side of Infinity will also be discussed. (Paper first presented at IPS 2008.)
It’s now possible for a producer to finance a production and make a return on investment by licensing it to multiple users, something that was unimaginable only a few years ago.

What is fueling this impressive growth? It’s a combination of relatively low technology costs, coupled with versatility (easy-to-use real-time astronomy tools and the ability to play back linear movies), high audience impact, and a large population of similarly-aged domes in need of renovation. All have driven expansion of fulldome among planetarium users. Distribution standards—non-existent before fulldome—have likewise stimulated the growth of an impressive show library, currently numbering nearly 100 titles.

It’s now possible for a producer to finance a production and make a return on investment by licensing it to multiple users, something that was unimaginable only a few years ago. The availability of a library of shows has, in turn, encouraged others to invest in fulldome technology, expanding the user base and offering a glimpse of a promising future. And this is just the beginning: a continual stream of quality, reasonably-priced content will be needed if these venues are to attract new audiences, encourage repeat visitation, and create sustainable businesses.

Assuming we have reached critical mass, then, the big questions are: What’s the business model? How do you make the numbers work? And how do you make a good show at the same time? We’ll have a closer look at these in the following.

A Brief History

In the early days, system manufacturers essentially subsidized the development of full-dome shows to sell equipment and grow the industry. Examples include some of the more widely distributed shows: Evans & Sutherland’s Wonders of the Universe, Spitz’s Oasis In Space and Sky-Skan’s Infinity Express.

Next were institutions that made shows for their own box offices and, secondarily, for distribution to others. On the high end (read: expensive, big-budget), shows like AMNH’s Passport to the Universe and Search for Life: Are We Alone? come to mind, while planetariums like the Burke Baker in Houston (Fantasy Worlds), the National Space Centre in the UK (Big), the Clark Planetarium in Salt Lake City (The Secret of the Cardboard Rocket) and others began to create content with more modest budgets.

Today, we have a big library with two out of three titles produced by planetariums. This trend seems to be on an upswing as more planetariums get into the content business.

Most recently, several films originally released in Imax format have been digitally reformatted and will premiere as fulldome movies. Evans & Sutherland and Spitz will be distributing two of these: nWave Pictures’ Fly Me to the Moon and Graphic Films’ Africa: the Serengeti. If they are successful, we will likely see more large-format titles converted in the future.

A New Ballgame

With so many available movies, why is now a good time to consider making another? Because, essentially, it’s a new ballgame. Unlike the early days, there are now many theaters looking for compelling, new content. Much of what’s been produced over the past 10 years is dated or of uneven quality, and many programs are showing their age; probably less than 20% of available titles produce significant revenue. It’s the more recent, better funded shows like Black Holes: the Other Side of Infinity, Cosmic Collisions, The Zula Patrol: Under the Weather and Dawn of the Space Age that are gaining most traction in the marketplace. These are all ambitious projects, and most are well on their way to making back their production costs and more. We’ll take a closer look at two of these in a bit.

Know Your Market

Most fulldome titles (and the most successful shows) currently favor space science themes, though interest in programs on earth science, biology, chemistry, history, climate change, and more. Shows like Evans & Sutherland’s Seven Wonders and Stars of the Pharaohs, which combine space science with cultural history, and National Space Centre’s Astronaut, which blends human biology and space science, have also done well, so cross-over subjects may be worth consideration. Space science shows will likely continue to dominate, until fulldome gets established elsewhere and new markets and programming genres emerge. A few theaters are experiment-
Funding Your Project

There are several funding models, though most fall into one of three categories: grant-funded, a combination of grant funding and private equity, and private equity. There’s no rule about how most shows have been funded to date, except to say that the more expensive projects typically have a large grant component.

Federal funding sources: In the United States, the National Science Foundation is probably the most notable, but the application process can be extremely (with a capital E) competitive, time-consuming and expensive. Other sources include the National Institute of Health (for health-related subjects), and NASA (many different directorates) for space-related subjects. A total of funded fulldome projects already.

Private foundations: Private foundations with special interests may be supportive of your project. These are usually formed by wealthy corporations, trusts and individuals to benefit individuals and small businesses, and they’re required to distribute a percentage of their total assets each year to keep their tax exempt status. Sniff these out online or with the help of an experienced development person.

State and local funding sources: Check with your state or local film board to learn about tax-credit programs or grant opportunities for theatrical release movies; your fulldome project may qualify. One of our projects was recently awarded a “Creativity in Focus” grant that will cover 20% of the cost of your project, if you are planning to use a distributor.

Grant funding/private equity: This is similar to the above model, with the addition of private equity. It may strengthen your proposal in the reviewers’ eyes to see that your budget includes a chunk of cash that has already been committed by yourself or an investor.

Private equity: This can be a single investor, a group of investors, or a small consortium each with an equity interest in the project or who may want a license for their theater in exchange for a discounted, pre-release fee or the ability to resell the product within a specific geographic region. The deals can be very creative, so don’t be afraid to explore all possibilities.

How Much Should I Spend?

Once you’ve figured out your source of funding, create sales projections to project future revenue based on the genre of your project, your expected revenues vs. expenses, etc. Your financial backers (owners, partners, investors) will want to see these in the form of a business plan before agreeing to finance your project.

Depending on the kind of show you are hoping to make and the depth of your pockets, expect to spend $150,000 on the low end to more than $1 million (in USD). A typical average of what most are spending for a 24-minute 3D animated program (4k x 4k resolution) is probably somewhere in the middle, between $300,000 and $600,000, or from $15,000 to $25,000 per finished minute. These figures are based on our experience working in the U.S., and do not consider outsourcing work to near shore or offshore animation companies.

Marketing and Promotion

To your production budget, add marketing, promotion and rollout costs (these are variable, but reserve a reasonable budget plus a percentage (typically 20% to 30%) if you are planning to use a distributor. Working with a distributor will assure you best exposure to your future customers. A distributor will promote your show through a variety of channels, including websites, direct mail, list-serves, targeted ads, promotion at industry trade show events and the like.

A distributor will also negotiate licenses with end-users; provide formatting, encoding and quality control services; coordinate installation; collect license fees; and send you those royalty checks you have worked so hard for. Make sure to support your customers with a solid press kit, poster artwork, web trailers, teacher workshops, educator guides, etc. Work closely with the public relations departments at the licensor museums to make sure that your show’s launch goes off smoothly.

Licensing Your Show

Next, we’ll take a look at what museums/planetariums are paying to license dome content. This is hard to quantify definitively, since content is available at many price points—there are cheap shows, medium-priced shows and expensive shows—as well as different size venues paying different fees for the same program based on criteria like attendance, number of seats, dome size, etc. For purposes of discussion, what we can offer here are some general guidelines (see Figure 1).

So, assuming a production cost of around $400,000 and a 25% distribution fee inclusive of marketing costs, the project would need to gross around $535,000 to break even. This translates into licensing our hypothetical show 20 times at $8,000 each, and another 15 times at $25,000 each to gross this amount, or some combination that yields similar results. Looking at it another way, our show would need to play in about 10% of the existing 400 theaters, for an average fee of $13,000.

How long will it take to do this? It all depends on the quality of the show and how aggressively it is promoted. If it becomes popular, anywhere from a year to three years; if you approach your project with an eye to the longer term (three to five years), all the more chance you’ll meet your expectations. It’s also possible to make a flop and never make back your investment. This is why it’s so important to do your homework first and make sure that you don’t have another Heaven’s Gate in the making—and definitely don’t count on revenue from DVD sales!

(The production of Heaven’s Gate, a 1980 western, was “plagued by cost and time over...
runs, negative press, and rumors about director Michael Cimino’s allegedly overbearing directorial style. It debuted to poor reviews and earned little money, eventually contributing the collapse of its studio United Artists and effectively destroyed the reputation of Cimino, previously one of the hottest directors in Hollywood due to *The Deer Hunter*.

### Challenges

We’ve worked on a number of fulldome projects and have found all sorts of challenges along the way, from pre-production through distribution of the finished product. Here’s a short list of what to expect:

**Start-up costs:** 3D animation is expensive and fulldome animation is even more so; producing 4k x 4k dome masters is not trivial. A significant and ongoing investment in infrastructure (computer workstations, rendering, storage, software) is a starting point. A dome preview facility is a prerequisite for viewing tests, dailies and the finished product.

**Staffing and personnel:** You’ll need an efficient production pipeline and work-flow methodology implemented by a solid creative and technical team skilled at all aspects of 3D production, network administration, hardware troubleshooting and more. Hire the best talent and expect to pay for it; be realistic about what you can tackle with your resources. Websites like www.payscale.com and others can give you some guidance about prevailing wage in your area if you are looking to hire staff.

**Pricing pressure:** There has been a general downward pressure on show license fees since the first fulldome show hit the screen ten years ago. More choice and lower cost is good news for exhibitors, perhaps not so good for producers. Price your show to compete relative to other shows, explain your rationale if it costs more, and don’t be surprised to hear “that’s so expensive”.

New theaters don’t mean immediate opportunities. With more theaters opening, there will ultimately be more opportunity to license content—but not necessarily right away. The newly-created slots are often already taken by content that has been bundled with hardware, so these theaters may not need or be able to acquire new programs for several years.

Not all theaters are regular customers. Many smaller theaters—the biggest growth area for fulldome—often don’t have a regular show schedule. They are used primarily as teaching classrooms, not for playing movies for the public. If they serve school groups and can fund the purchase of a show or two, when these prove successful and popular, it’s easier to find funding for new titles.

**Long lead time:** Savvy theater managers plan their schedules a year or more in advance, so making them aware of your project in plenty of time is also important if you want to hit the ground running on completion. It can take a while to get your show into distribution.

### Partnering for Success

We have been fortunate to have been involved in two very successful fulldome projects in the past couple of years: *Black Holes: the Other Side of Infinity*, a high-end scientific visualization production that brings the current science of black holes to the dome screen, for general audiences; and *The Zula Patrol: Under the Weather*, a show for kids ages 5-9 and their families about weather on Earth and other planets. We learned a lot from both projects, and the lessons learned may apply to your project too.

*Black Holes* is a collaboration with a great group of partners: the Denver Museum of Nature & Science, Thomas Lucas Productions, the National Center for Supercomputing Applications, and the Public Broadcasting Service program NOVA. The project was funded with NASA seed money and a grant from the National Science Foundation. On this project, Spitz did some interesting fulldome standards research, contributed a few minutes of animation, and managed the eventual distribution of the show. Within two years of its launch in Denver, we have licensed *Black Holes* to more than 50 theaters around the world, and it has been translated into multiple languages. The project leverages the talented DMNS team; Tom Lucas, a seasoned science writer/producer/director with extensive broadcast experience; Donna Cox’s scientific visualization team at the National Center for Supercomputing Applications; and a group of expert science advisors.

*The Zula Patrol: Under the Weather*, a Zula USA, LLC and Spitz joint venture, has been similarly successful, with more than 25 licenses since its release last summer. It was self-funded with several pre-release licenses signed and a promise to launch at Chicago’s Adler Planetarium. *Under the Weather* is based on *The Zula Patrol*, space science TV series that today reaches close to 200 million households worldwide in the US and internationally.

The show was a collaboration, taking advantage of Zula’s expert team of writers, producers and educators and Spitz’s 3D dome animation experience. Produced over a period of about two years, the project successfully leverages the Zula brand and builds on Zula USA’s commitment to developing science literacy in young children through a variety of media channels.
Feedback on both projects gives us some insight into why they are successful:

**Evergreen topics:** Both black holes and weather are inherently interesting and appealing subjects to audiences; both subjects have a long shelf life.

**Clear writing:** Both projects used professional writers, educators and scientists for script development and review. You are selling to scientists; get the science right!

**Curriculum connection:** Both projects support national and state science education standards—your show will be evaluated by some institution’s education department, who will either bless it for further scrutiny or pass on it.

**Collaborate with the best:** Work with great partners from concept, through production, and into launch. Leverage name brands wherever you can and partner with folks with great track records.

**Celebrity drawing card:** Make your show stand out from the pack—a celebrity narrator is a plus (but not enough to save a bad show).

**Evaluate, evaluate, evaluate:** Test screenings of your project at various stages will tell you what works and where your story needs help.

**Summary**

Fulldome technology, now established in a network of more than 400 theaters, is helping planetariums to reinvent themselves. Distribution standards make it possible for shows to be played on a variety of hardware platforms, allowing content producers to recoup development costs through wide distribution channels. Assuming production costs of $300,000 to $600,000, it is possible to make a return on one’s investment in three to five years, or less. Leveraging name brands, partnering with experienced producers and selecting an evergreen topic can create demand for your program while mitigating risk. Finally, an ongoing supply of better funded, high quality shows should produce positive results industry-wide: for producers, a return on their investment; for manufacturers, more theater sales; for theater operators, an improved bottom line; and for audiences, a more memorable and satisfying experience.

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The vision of the International Year of Astronomy 2009 is to help the citizens of the world rediscover their place in the Universe through the day- and night time sky, and thereby engage a personal sense of wonder and discovery.

All humans should realize the impact of astronomy and basic sciences on our daily lives, and understand better how scientific knowledge can contribute to a more equitable and peaceful society.

The IYA2009 represents an excellent opportunity for the planetarium community to not only further their activities, but reach new audiences. The IYA2009 is constantly growing in the number of people and organisations involved, but also in the number resources it makes available to its partners. The IYA2009 trailer is for instance available in 43 languages, as well as in fulldome format. This is a unique resource for planetariums and science centres.
First came the stars. Then came our sun and planet, people and civilization. Soon afterwards came flags. The first flags were used on battlefields—the very beginning of long-distance communication that is still evolving today. And, as time passed, flags came to represent nations.

If you've ever tried to identify a flag bearing several stars, did you sense a familiar starry pattern? It's not surprising that several countries have come to represent themselves with flags that bear easily identifiable constellations. Constellations, after all, are the inventions of humans trying to seek order through the movement of the stars across the sky. It seems natural that a search for order should apply to governments as well, and that the most important star groups be selected for the symbols of order.

For the purpose of this article, flags bearing the sun or the moon have been deliberately omitted to focus strictly on flags inspired by official constellations, stars, or star clusters. A vexillological search (vexillology is the study of flags) has failed to come up with a single official flag bearing a planet.

Two star groups stand out in any examination of stellar flags: the Southern Cross and the Big Dipper.

The Southern Cross

Crux, better known as the Southern Cross, lies across the Milky Way and is the smallest of the 88 official constellations, covering only 68 square degrees of the sky. Originally part of Centaurus, Augustin Royer established it as a separate constellation in 1679. Despite its small size, it is one of the most distinctive and well-known constellations. To many peoples, the Southern Cross evokes their place of origin, and it appears on national flags, company logos, and memorials throughout the southern hemisphere.

Despite being thought of as a Southern Hemisphere constellation, the Southern Cross was known to the ancient Greeks. In 2000 BC, Crux was just above the horizon of mid-northern latitudes during the evening in the spring. However, the precession of the equinoxes has gradually brought it beneath most northern horizons. Nowadays, it is permanently visible only to those living south of -34° latitude, although it can occasionally be seen below +26° (about the latitude of Miami).

Australia: Perhaps the most famous flag that depicts the Southern Cross is Australia’s. The flag also sports the Union Jack and a large, 7-point star underneath which symbolizes the Commonwealth Star rather than Alpha Centauri, as one might initially surmise. The first six points represent the six original states of the Federation of Australia, while the seventh point stands for the territories and any future states. It was chosen in 1901 after the federation was formed and became the legal national flag in 1954.

Meiwi: A more recent Southern Cross flag is the Meiwi flag, designed in 1992 by the Ngarrindjeri and other Aboriginal people for the 25th anniversary of the 1967 Referendum recognizing Aboriginal people as lawful Australians. According to an elder, Meiwi means “Life to all Living Things, Creatures Great and Small.”

The flag shows four colors (red, white, black, and yellow), the symbolic four human skin colors of people living on Earth. There is also the Sun shining during the day. It promotes Indigenous Australian autonomy by recognition and respect for their cultural and spiritual beliefs.

Unlike the national flag, though, the Meiwi Flag bears the pointer stars, Alpha and Beta...
Brazil’s Constellation Banner

Brazil’s flag is truly unique: it is actually a sky chart. The history of this flag begins on November 15, 1889, when the republic was proclaimed after the overthrow of Emperor Pedro II. For the first four days of the new republic’s existence, the so-called Barbosa Flag was used. Very much inspired by the U.S. flag, it bore 21 stars (representing 21 states) and gold and green stripes. It was replaced on November 19, mainly to avoid confusing it with another nation’s flag.

The new flag certainly corrected this shortcoming. It sports a green field, symbol of Brazil’s lush forests, with a yellow rhombus representing the country’s extensive gold mines. Within the rhombus, there is a blue circle bearing a sky chart and a white band. The band bears the words “Ordem e Progresso” (Order and Progress) and represents neither the equator, nor the zodiac, nor the ecliptic.

The sky chart shows the sky over Rio de Janeiro, the nation’s capital, on November 15, 1889 at 8:30 a.m., when the Southern Cross was on the meridian. What is striking about this chart is that it illustrates the celestial sphere as viewed from the outside, not unlike the sky charts of the 16th, 17th and 18th centuries. Benjamin Constant, a member of the provisional government who prepared the decree, credited Professor Manuel Pereira Reis, chairman of astronomy at the Polytechnic School in Sao Paulo, with the idea of the new flag. Texeira Mendes collaborated on the design and it was executed by painter Décio Vilares. Each star is specifically assigned to a state except for Sigma Octantis, which is assigned to the Federal District of the National Capital.

The current flag was officially adopted in 1992 and contains 27 stars. Surprisingly, neither Alpha nor Beta Centauri ever made it onto the flag.

Some of the Brazilian states fly astronomical flags as well. Barbosa’s flag heavily inspired Goiás’ flag. It bears the five stars of the Southern Cross in its hoist. Maranhão’s flag features Graffias (Beta Scorpii), the very star that represents it on the National Flag.

Pará has also selected the star that represents it, Spica, and set it in a white stripe representing the Zodiac. Paraná uses the Southern Cross on a flag strikingly similar to the National Flag.

The flag of Brazil is akin to a star atlas featuring 9 constellations. The constellation of the Southern Cross (number 6 in the diagram) is on the meridian. To the south of it is Polaris Australis, actually Sigma Octantis, numbered 7, representing the Federal District. The Star of Pará (Spica) is on top. A list of constellations and stars on the map: A list of constellations and stars on the map:

1. Procyon
2. Canis Major, with the largest star depicting Sirius,
3. Canopus
4. Spica
5. Hydra
6. Crux
7. Sigma Octantis
8. Triangulum Australe
9. Scorpius, with the largest star depicting Antares

ANTARCTICA

Generally speaking, member nations of the Antarctic Treaty System (ATS) fly their own national flags on their research bases. Though all territorial claims by signatories of the ATS are suspended while they are members, some nations use a distinctive flag which reflects their claim.

Argentina: Argentina claims a slice of Antarctica from longitude 25ºW to 74ºW as part of their province, Tierra del Fuego, which is separated from the mainland by the Strait of Magellan. This claim, which also includes the Falklands (Malvinas), the South Georgia, and South Sandwich islands, is not recognized internationally since it overlaps British and Chilean claims.

In 1999, Argentina adopted a specific flag.
for this province and all its claims. Nicknamed the Albatross, its orange color represents the geography of Tierra del Fuego. The blue color stands for the sky and the sea surrounding this province, and links it to the national flag. The stars of the Southern Cross also symbolize the southern location of the islands and other territorial elements making up the province. The styled Albatross is a local bird and its flight symbolizes freedom.

**Chile:** The province of the Magallanes y la Antártica Chilena Region include Chile’s Antarctic claim from longitude 53° W to 90° W. Other territories are the islands south of Tierra del Fuego and Cape Horn.

The upper part of the flag is blue, representing the sky, and contains the Southern Cross. Below, a serrated edge symbolizes a mountainous horizon in ochre yellow, the typical color of the region’s vegetation. The fields are separated by a narrow white stripe that symbolizes the snow crowning the mountains.

The orientation of the Southern Cross is somewhat intriguing. It is inclined toward the east, 110° from the vertical, as though it were barely rising in the sky. This may be for purely aesthetic reasons and because the upright Southern Cross constellation is so closely associated with Australia.

**New Zealand:** New Zealand claims the Ross Dependency. It is defined by a sector originating at the South Pole, passing along longitudes 160° E to 150° W, and terminating at latitude 60° S. The dependency includes part of Victoria Land and most of the Ross Ice Shelf. It also encompasses Ross Island, Balleny Islands, the small Scott Island, and Roosevelt Island.

As a rule, the official New Zealand flag flies over this territory. However, unofficially, another flag has been flown: the Ross Dependency flag. Set in an ice blue background to represent the Ross Sea, it retains the Union Jack in the hoist, next to a slightly smaller, four-star version of the Southern Cross. The white horizontal bar at the bottom represents the Ross Ice Shelf.

**The Northern Hemisphere**

National flags of the Northern Hemisphere do not feature astronomical constellations. In the Northern Hemisphere, the ratio of land to ocean is about 1 to 1.5. That ratio in the Southern Hemisphere is 1 to 4. Although seafaring and celestial navigation were the dominant means of exploration and commerce in both hemispheres, the lack of a pole star and the importance of the Southern Cross in celestial navigation may explain its prominence on Southern Hemisphere flags.

Southern constellations also are fairly recent and are of more current significance, unlike their northern counterparts, created millennia ago.

Another reason might be a lack of solidarity brought on by centuries of wars and conflicts. The northern flags seem intent on reflecting intense local nationalistic pride, underlining differences between neighbors.

**The Big Dipper**

However, some northern flags do have an astronomical connotation, and many feature the Big Dipper and Polaris, the two most important to northern starry navigators.

The Big Dipper, omnipresent for centuries, is the best-known asterism in the northern sky, and it appears on several flags. It bears the dipper name in North America because its stars form the outline of a large ladle, or dipper.

The seven stars (“Septentrio”) of this asterism are the origin of the Latin word septentriones, meaning “north,” which is the root of the adjective septentrional (meaning “northern”) in English, French, and Spanish.

The Big Dipper, of course, represents the body and tail of Ursa Major, the Great Bear.

**Alaska:** The state flag of Alaska consists of eight gold stars, forming the Big Dipper and the North Star, on a dark blue field. It was adopted as the flag of the territory in 1927 and retained when Alaska achieved statehood in 1959.

The blue field represents the Alaskan sky and the Myosotis, otherwise known as the forget-me-not, the Alaskan state flower. The North Star represents the future state of Alaska, the most northerly in the Union; the Dipper stands for the Great Bear, symbolizing strength.

**Cherokee Nation:** The Cherokee Peace Flag consists of a white field with seven red stars forming the dipper. The red stars stand for victory and success, while the white background represents peace and happiness. The seven stars are arranged in the pattern of the constellation Yonegwa, the Big Dipper, and the seven points of each star symbolize the seven clans of the Cherokee people. The Cherokee War Flag was identical to the Peace Flag, but with the colors inverted.

**Nunavut:** Created from the Northwest Territories in Canada, Nunavut became an official territory on April 1, 1999. Its flag was also proclaimed on that date. It features a red inukshuk, an Inuit land marker for guiding people and marking sacred or special places. Red represents Canada; the colors blue and gold represent the riches of the land, sea and sky.

Image Credit: All images obtained through Wikimedia Commons, a copyright free and freely licensed media file repository.
The blue star is the Niqirtsuituq (pronounced Ni-kir-tsu-ituk), the North Star, the traditional guide for navigation. The North Star is also symbolic of the leadership of elders in the community.

Ireland: Two different versions of a Starry Plough banner have been used in Ireland. The original one was created during a period of violent labor unrest. In 1916, the Irish Citizens Army flew this banner during the Easter Rising. Its significance was that a free Ireland would control its own destiny from the plough to the stars.

The banner was redesigned during the 1930s by members of the Republican Congress and adopted as the emblem of the Irish Labor movement, including the Irish Labor Party, although they eventually dropped it. The Labor Youth and Ogé Shinn Fein, among others, have used various versions of that banner.

Spain: The flag of the Autonomous Community of Madrid bears no resemblance to the Big Dipper, although there are claims its seven stars do represent it. The flag has a red field with seven, five-pointed white stars centered in two rows, four on top and three underneath. Each star represents one of the administrative areas of the province of Madrid.

Red is the color of the Castilian arms. The seven stars come from the coat-of-arms of the city of Madrid. According to legend, they have two possible origins: 1) They stand close to the female bear in the Madrid coat-of-arms, just as the seven stars of the plough stand close to Ursa Major; 2) Madrid was conquered by Alphonse VI and established as the seat of government, whereas the seven stars in the Plough represent the North and the government of the heavenly bodies.

Orion
A prominent and conspicuous constellation, the bright stars of Orion straddle the celestial equator and are visible from everywhere on the planet. Orion, the hunter, stands on the banks of Eridanus (the river) with his two hunting dogs, Canis Major and Canis Minor, fighting Taurus the Bull. Lepus the hare is found underneath.

India: India’s current flag does not display any astronomical feature. However, when India Viceroy Lord Ampthill suggested a national flag circa early 20th century, an Anglo-Indian newspaper put forward a colorful proposal. The flag had a red border 1/4 of an inch wide. A vertical band drawn at the hoist end one inch from the border contained the constellation of Orion, a familiar sight in the eastern sky, set upright, silver stars on a purple background. The stars of the constellation represented United India (the number being modified to suit the United Provinces and States).

The blue star is the Niqirtsuituq (pronounced Ni-kir-tsu-ituk), the North Star, the traditional guide for navigation. The North Star is also symbolic of the leadership of elders in the community.

The remainder of the flag was divided into three horizontal bands, colored from the top, dark blue, green, and light blue. The deep blue band stood for Hindus and Buddhists; the green for the Mohomedans, and the light or sky-blue band for the Indian Christians. The red border symbolized the “Foreign” element, which welded India into a whole, and kept it united.

Conclusion
National flags bearing actual stars and constellations are a reminder that humans have looked up to the night sky in wonderment for as long as anyone can remember. These flags reflect their nations’ location on Earth and are a reminder that the universe is a spectacular vista, our greatest environment.

For More Information
Special thanks to: Dr. Jim Kaler, Rob Raeside, and Louie Bernstein
As part of a wide range of education and public outreach activities for the International Year of Astronomy 2009, the European Southern Observatory (ESO) is collaborating with the Association of French-speaking Planetariums (APLF) and other partners in Europe to produce a new planetarium show centered on the Atacama Large Millimeter/Submillimeter Array (ALMA).

APLF has been producing unique planetarium shows for Europe since 2001. Its first program, produced in collaboration with the French space agency CNES, a show about Earth seen from space. In 2002, in collaboration with ESO, it made a very successful show for the 40th anniversary of ESO. The program was called Mysteries of the Southern Sky and celebrated the performance of the Very Large Telescope (VLT), Europe’s flagship for ground-based optical/infrared astronomy. Approximately 40 planetariums presented each program and Mysteries is still being shown at one.

More than 30 planetariums in numerous countries have already agreed to buy The Quest of Our Cosmic Origins, the new ALMA show. The show will be available for viewing from autumn 2008—in order to be included in European school programmes—and officially inaugurated early 2009. The ALMA planetarium show is an official part of the French activities for IYA 2009 and represents a unique chance for planetariums to be associated with the special year of activities.

ALMA arguably will be the largest ground-based astronomy project of the next decade. It is currently being built by partners from Europe (ESO), North America (under leadership of the National Radio Astronomy Observatory), and East Asia (the National Astronomical Observatory of Japan), on the 5,000 metre plateau of Chajnantor in the Chilean Atacama Desert.

With its reconfigurable array of 66 antennas, ALMA will study the universe in the millimetre-submillimetre wavelength domain. Light at these wavelengths shines from vast cold clouds in interstellar space and from galaxies with very high redshifts—the waves being stretched and “reddened” more and more as their distance increase in expanding space. ALMA will open a new window on our cosmic origins on two scales. First, it will explore the origin of galaxies in the primordial universe, analyzing the earliest and most distant galaxies forming at the edge of the observable universe roughly 10 billion light years away and paying special attention to colliding galaxies.

Secondly, the origin of planets (and our Earth) will be scrutinized in interstellar molecular clouds, the dense regions of gas and dust where new stars are being born that appear dark and obscured in visible light, but shine brightly in the millimetre and submillimetre part of the spectrum. ALMA will provide detailed images of stars and planets being born in gas clouds near our solar system.

The new planetarium show’s emphasis is the incomparable scientific endeavor that the ALMA project represents. Produced by Mirage3D, the 30-minute show will include unique animations and footage, leading the spectator from the first observations by Galileo 400 years ago to the world of modern astronomy. Then the program not only will leave the optical wavelength domain to explore the millimetre range, it also will leave light polluted cities for unique settings in some of the highest and driest places on Earth.

In addition to providing financial support, APLF is in charge of making the scenario and the script, producing the show in several languages, and being responsible for the promotion, duplication, and distribution in France, Europe and beyond. ESO also is financially supporting the project in addition to supplying images, computer simulations and videos. A scientific committee composed of astronomers from APLF and ESO is providing the scientific expertise.

Quest will be made available to ESO’s partners in the ALMA project, thus the show is being produced in French, German, English, Spanish, and Italian, and since the Chicago IPS conference, more versions are being considered: Portuguese, Greek, Danish, Brazilian, and Japanese. ESO will also produce a Chilean version and help provide associated documents for the visitors.

The show shall be available in three different formats: fulldome video, allsky immersive projection with video windows, and traditional images plus video for the smaller planetariums. It will be available to all planetariums worldwide for a small fee, depending on the type and the size of the planetarium, to cover basic costs.

Henri M.J. Boffin
European Southern Observatory

Agnès Acker
Observatoire/Université de Strasbourg & APLF

A young woman astronomer will lead the public throughout the story. Photos courtesy APLF
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NASA
New Technologies Need New Tools

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Abstract: The digital technologies that are now becoming available to planetariums are bringing an enormous change to the way planetariums work and, what’s more, to the possibilities about and impact of the messages they transmit. Navegar Foundation, which manages the Centro Multimeios Espinho where the Espinho Planetarium is located, has been dedicating efforts in different areas of digital planetariums, including content creation and software tools development. Among these tools, we would like to present two that recently have been developed for pre-rendered content production. We would like also to present a new tool dedicated to test content under production and to perform real-time presentation of shows in the planetarium, integrating real-time sky simulations and the display of pre-rendered content. (Paper first presented at IPS 2008.)

The new millennium brought with it a revolution to the planetarium world. Systems became widely available that could project digital footage to fill the entire dome. This full-dome evolution brought needs, and a content creation tool is one of them. Tools to handle digital footage in cinema or television have been available for quite some time. However, the fulldome paradigm, in several aspects, is quite different from cinema and TV, mainly due to the nature of the projection screen and the complete sense of immersivity.

Plug-ins Do the Job

To tackle this problem, plug-ins were created for existing digital tools to handle/produce dome content without the need to create an entire new tool.

Another important aspect is the need to test content for the dome. Usually content is created and managed in a 2D-projection of the sphere in the plane (the fisheye projection has been accepted as the standard), which gives a good notion of the result. But in many important aspects this projection could be misleading, due to the extremely wide field of view involved.

A simple example is shown in Figure 1, which displays an outdoor image of a square in fisheye projection. Looking at the image, it is difficult to evaluate what will be the final result when this image is projected on the dome. Here the case is even harder since the image will fill 210º, more than the normal 180º of a dome.

A testing tool, to visualize content in a computer screen, has also been designed to offer an easy and simple solution to project content in digital systems based on a single projector, mainly used in small and portable planetariums.

Fulldome—A Composition Tool

A compositing/editing tool is a basic one needed to handle digital video. In traditional digital video, the input footage that is being worked and the final edited product are of the same type. Both are usually rectangular and usually no image distortions are involved.

For fulldome, the case is often the opposite. The footage that is being composed is usually in standard format (recorded with a video camera or created using a standard camera in an animation software), and both the compos-
iting window and the final result are a projection of the spherical screen in the plane, usually a fisheye projection (see Figure 1).

A tool, now called Fulldome 2.0, was designed to handle all the different aspects of dome content compositing/editing in the form of a plug-in for Adobe AfterEffects©. Besides being able to distort the content to adapt for the curved surface screen, the software is able to place the footage in a specified position in the dome, now defined in terms of altitude (reference is the spring line) and azimuth (reference is the north direction).

Among many others, a set of astronomical features are available that enable the precise location in the celestial sphere, as well as to simulate many astronomical phenomena.

Although the hemispherical surface tends to be more difficult conceptually when compared with the traditional flat screen, the use of the plug-in is very intuitive. The user imports content to the composition and sets up all the necessary parameters associated with the kind of input footage in use, such as place, size, and others.

Often, a scene involves the use of several instances of the plug-in, one for each input. Figure 2 shows a fisheye image of a scene were several instances were applied: the sky background is an artistic fisheye image of the night sky and the background is a panorama of the forest, overlaid by the foreground image of the characters, trees and tents previously rendered on a 3D animation software.

Content can be created for tilted domes, for domes with a size in excess of the traditional 180º up to 360º, or even for cylindrical environments.

A Wide Field Camera

Producing content in 3D animation software involves taking a sequence of images or a movie obtained by a camera available inside the software. These virtual cameras available are of standard type that are intrinsically limited to a usable field of view (FOV) not much in extent of 100 degrees.

To render images involving a very large FOV, the usual procedure is to set a rig of up to six cameras, pointing front, back, left, right, up and down, with a FOV of 90º by 90º each (see Figure 3). The six images are then combined to create a single image that fills the desired FOV.

A plug-in, for the animation software Cinema4D©, was designed to avoid all the intermediate steps, obtaining a single wide field image immediately. WFCam4D brings an important simplification to the production phase, and the images can fill the entire 360º by 360º FOV.

Many different types of image projections are available, including fisheye, orthographic, stereographic, etc. Figure 4 shows two images rendered with WFCam4D, with a field of view of 360ºx360º in two different projections, fisheye and Aitoff.

Software to View, Preview Dome Content

As described earlier, content produced for fulldome is made in a frame (the master) with a format corresponding to a projection of the dome on a plane. The standard is the fisheye projection, like in Figures 1 and 2.

Due to the distortions involved, looking at the master does not give a clear idea of the entire scene once projected on a planetarium dome.

One of the solutions is to look at the master in various projections, like in Figure 5. In this cylindrical projection, there is a much better sense of the region close to the spring line, contrary to the fisheye that gives a better sense in regions close to the zenith (see Figure 2). The use of an inclined horizon is also highly perceptible in this image.

Another solution is to go through an interactive process, with successive projections on a planetarium until the desired result is achieved. However, repeated access to a planetarium is difficult, costly, and time consuming. The case is even more extreme in multiple projector systems.

A tool was designed to give the user the ability to have a clear notion of the final result in the planetarium, without leaving his or her desk. What's more, it enables a preview of the content in intermediate phases of development, saving a lot of time and effort.
The Capabilities

DomeView is a real-time tool designed to view and preview dome content. For previewing, DomeView offers the possibility to see in 3D the content projected in a spherical surface, like in a planetarium dome (see Figure 6).

The observer position can be changed, like a visitor who changes seats in the planetarium, and it is even possible to see the scene from outside the planetarium. A model of a planetarium can be added for a more realistic view (see Figure 7). To cope with many modern planetariums, the tilt of the dome can be set accordingly. This software is able to display the entire dome up to 360º.

The viewing capabilities displays the content in a 2D projection and allows the projection in a dome using a single video projector, a fisheye for example. The content can also be projected on a dome using a spherical mirror, with the content being distorted in real-time according to the setup (see Figure 8).

The Content

DomeView handles video and images of different types. The content can also arrive directly from third-party programs, such as Adobe After-Effects or Photoshop, the free open source planetarium Stellarium, Celestia, etc. It is also possible to display content arriving directly from a webcam.

The media content is displayed according to the selected location in the dome, size and projection. If the media source is Fulldome plug-in under Adobe AfterEffects, all options are disabled since the media is configured automatically.

Conclusions

Digital systems brought a revolution to the planetarium world, with endless possibilities to what can be showed in a dome. Due to its young age, new tools to handle content are been constantly released. Here we presented a set that have been developed by Navegar Foundation that cover different areas, from production to projection, and although powerful, they are simple to use.

Being able to produce, test and also project, using the same piece of hardware, brings obvious benefits, making way for the user to concentrate on what’s most important, the content itself.

To learn more about Navegar’s new tools, check the websites at fulldomeplugin.multimeios.pt; WFCam4D.multimeios.pt; and domeview.multimeios.pt.
Explore the Universe with 3-D Astronomical Simulation
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Minutes to learn - light years to explore!
Astronomical Contests in Slovakia: The way to attract people to public observatories and planetariums

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First, a slight digression to share the story of the history of the Slovak Central Observatory in Hurbanovo. Nicolaus Konkoly Thege founded the facility as a private observatory in 1871. Thege was a skilled technician and natural science, especially astronomy. He had good contacts with active astronomers in Europe and, thanks to them, built up a seriously equipped astronomical observatory.

From the beginning the observation program was orientated to the sun and interplanetary matter. During the next 20 years, Thege also managed to build up a geophysical and meteorological observatory on his site.

In the year 1899 the observatory became a state observatory. Over the 130 years of its existence, many notable Slovak, Czech and Hungarian astronomers worked at in Hurbanovo. A 60-cm refractor was installed in 1924, one of the biggest telescopes in Europe at that time. The first photographic observation of Pluto was made with this telescope in 1930.

In 1969 the observatory became the Slovak Central Observatory with the added mission of becoming the networking centre for the other 15 public observatories and seven planetariums in Slovakia.

The Four Activities

Today, the present activities of the Slovak Central Observatory are divided into four parts:

- The scientific department is oriented to solar observation to the extent of its instruments. It logs more than 300 observations of the surface of the sun per year, takes spectral analysis of the solar surface, and makes flare and corona observations during total eclipses.
- The editorial department issues the magazine Kozmos six times a year, as well as publishes the Astronomy Yearbook, an astronomical calendar, and text books with the topic of astronomy.
- The optic and mechanic workroom is oriented to the fabrication of 120-mm mirror telescopes of Newton type and repairing astronomical instruments.
- The Planetarium Department is concerned with the popularisation of astronomy and astronomy education.

The planetarium in the Slovak Central Observatory was installed in 1983. A Zeiss KPI was installed under a 6-m dome. From its beginning, the activity in the planetarium was orientated to direct lectures for its visitors. The program is provided by skilled lecturers who have a lot of experience with astronomy and with communication in the field of popularisation of astronomy and collateral science.

Our observatory is mainly oriented to education of young people aged between the ages of 10 and 18, 70% of our visitors are within this age limit. The lecturer under the dome of the planetarium adapts to the needs of the audience; this direct speech helps us to communicate with people about topics they are interested in.

A Way to Reach People

But the field of popularisation of astronomy is wider. It can be provided not only inside the planetarium or public observatory, but also outside them. One very important method that we use to reach people outside of the facilities is astronomical contests. Because the main percentage of visitors to the planetariums and observatories are young people, our astronomical contests are oriented to this age category.

Astrophoto

The first contest is “Astrophoto,” the oldest continuous contest organized by the Slovak Central Observatory. This contest is meant for people with an interest in practical astronomy. Thanks to this contest, observers can present their work through photos they obtain during observations.

Early in its history (the late 1970s), photography was oriented mainly to black and white. Authors made the photos mainly at home with their own equipment. Colour photographs were rare, and the coloured images were presented in slide format, which picture quality was much better.

In the beginning of 1990s there was a turn to colour photographs, thanks to cheaper automatic photolabs. Unfortunately, the commercial developing process brought problems with size. Bigger-sized photos were too expensive. This period brought more photos, but sometimes with less quality.

The participants were divided into youth and adults. The basic topics of the pictures were “astronomical snapshots” and variations on the topic of the sky. Until 2006 we divided these topics into classical photography and digitized images. As the quality of digital cameras improved, the classical methods fell by the wayside.

Starting in 2007 we eliminated the age differentiation and also no longer divide the basic categories into classical and digital. Approximately 40 astronomers participate each year. This contest is not appointed just for Slovaks, but also is open to those from other countries as well. The winning works are published in Kozmos and the authors are also financially rewarded.
Through Children’s Eyes

The second contest is a painting contest for students. It is called “Universe Through Children's Eyes.” This contest started 20 years ago. It is intended for children between the ages of 4-15. From the beginning it received friendly acceptance. Teachers liked the topic because it allows children's fantasy to evolve.

The participants are divided into five categories to prevent big age differences. Three age categories are for preschool and school children and the other two are for children from art schools.

The contest has two rounds. The first is a district round that chooses the best pieces of work to represent the individual districts in a state round.

The main aim of this contest is to attract schools into observatories and planetariums. When children start their works, they are looking for some inspiration. There are lots of books and films concerned with astronomy and this is the first material used by teachers to inspire their students.

But many teachers are not satisfied just with books. For children, the best inspiration is the direct touch with astronomy. They often visit their local observatories or planetariums. In Slovakia we have a well-developed network of astronomical observatories and most of the schools can easily travel to an observatory.

Our experience shows that from the period when we advertised the contest, the amount of visitors raises.

This contest is a good opportunity to stay in touch with schools. The first contact is the time when we declare the contest. We advertise it in local newspapers and, of course, directly to the schools by the post. When we finish the district round, there is the second opportunity to contact schools. We send them results of the competition and the awards for the winners.

The third opportunity is when the whole state round is finished. We produce a virtual exhibition on a CD of winners' pieces of work. This CD is sent to each school that takes part in the contest. There is not only the virtual exhibition, but also advertisement of observatories and planetariums. That way we are in touch with schools during the whole school year.

What Do You Know?

The third contest is meant for children with real interest in astronomy. It is a knowledge contest, called “What Do You Know About the Universe?” This contest has been organized yearly since 1991. It is divided into three age categories. Two age categories are meant for elementary schools and the third, for secondary schools.

For organizing this contest, we again use the network of observatories and planetariums. The contest is divided into three rounds. The first round is realized on the school district level. Observatories organize these rounds in districts near them, not just the districts they belong to. This way we are able to connect to over 70% of the districts in Slovakia (there are 73 districts in all).

The second round is realized in the higher districts. In Slovakia we have eight of them. From each district, the three best participants are chosen to the third Slovak round. This way, 24 competitors of each category take part in the final round.

The content of the contest is produced so that it could objectively verify the knowledge of the competitors. The most important part of the tasks is the so-called “blind map.” It is a star map where we hide parts. Competitors have to identify hidden constellations. The other part tests knowledge of the history of astronomy and space research, where competitors have to choose the right answer from four possibilities.

Then contest continues with exercises, such as telescope construction, distances in the universe, the aspects of planets, and basic astrophysics. Each exercise is adapted to the age category.

Approximately 1000 competitors take part in the contest yearly. The majority of participants in the contest are regular visitors of public observatories and planetariums. The planetariums are especially good at training for orientation in the sky because of their equipment. We try to implement a planetarium round to the contest. It is a special round orientated mainly to practical observations; this way we also inspire people to visit observatories.
Abstract: I would like to inform you about our work at The Nicholas Copernicus Observatory and Planetarium in Brno (Czech Republic). We have prepared a large variety of hands-on programs to popularize science, and I have selected only one topic from our activities, physical experiments, for my article.

Education plays an important role in everyday life. Planetariums are an appropriate choice for out-of-school science education because astronomy has a great advantage over other disciplines: the starry sky is familiar to every human. (Really, all people can enjoy the stars. Even the blind can experience stars in our institution because we have a haptic (tactile) planetarium and other aids.) As humans, we are deeply moved by sunrise and sunset or the dark heavens with twinkling stars. Therefore, astronomy combines the poetic emotional side with the rational science side of the learning experience. All these attributes can be fully utilized in creation of an educational program for students and the general public in planetariums.

Our experience shows that good vehicles for popularizing science are interesting experiments. The following article will describe how the Nicholas Copernicus Observatory and Planetarium in Brno (hereinafter planetarium) deal with some aspects of the popularization of science. These performances are prepared in cooperation with Masaryk University in Brno. We also record these physical shows; check them out at our website at www.hvezdarna.cz.

An Adventure in Science

In our series “Adventure Science” are shows such as “Adventure Physics,” “Adventure Chemistry” and “Adventure Optics.”

1 We have four hemispheres which represent the four seasons on the sky. Raised spots stand for objects in the night sky and blind people touch those spots to “see” stars, planets and constellations. The publication Touch of the Stars is prepared for blind audiences in Czech and English. In this publication blind people also can see planets, stars, the surface of the moon, etc.

2 We offer standard programs for the public, school youth and also younger children, under both the real and artificial skies.
In the first part of the series, “Adventure Physics,” the lecturer shows some amusing experiments from mechanics, thermodynamics, acoustics, optics and electromagnetism. For example, we demonstrate Archimedes’s cannon, the blowing out of candles by a vortex ring (the whirl ring was made from big drum), a hot-flue balloon, and swimming of a small item at water level. For the law of conservation angular momentum we use a swivel chair and bicycle wheel. We also present diffraction by hair and demonstrate an alcohol rocket.

“Adventure Chemistry” is the second part of the series. The lecturer demonstrates nontraditional chemical experiments, such as colored acid-base reactions, explosives reactions with hydrogen and oxygen, and fast crystallization, and also explains the fundamentals of chemistry, which we can watch every day around us in common life.

Seeing Optics

“Adventure Optics” is the last part of the whole series. The lecturer shows some amusing experiments from optics and demonstrates applications of the laws of optics in everyday life.

For example, Manet’s picture A Bar at Folies-Bergere is very good example for image by the mirror. The law of reflection is illustrated by stealth aircraft and the law of total reflection is demonstrated by flow of water. Other examples from wave optics include diffraction by hair, the hologram, and standing waves in a microwave oven. The scattering of light in a blue sky is illustrated by the scattering of light in a laser beam. We gauge the speed of light in the microwave oven, show interference fringes on a soap-bubble many other experiments.

We have great success with those programs. One important condition of success is the nature of the lecturer. The lecturer must be showman with excellent knowledge of physics and other natural sciences.

No Black Box Science!

The experiments must be convincing for the science to be fun! Experiments can look like “magic,” and it is the job of the lecturer to explain simply that the “magic” is the laws of nature and science. This is the reason we do not use a complicated apparatus or computer software. Complicated apparatus and computer programs present a “black box” type of science that hides the explanation—and the science—from the viewer.

The science demonstrations are done in the planetarium (the capacity of our planetarium is about 200 people) and we involve our audiences for a real hands-on experience. For example, when a visitor is involved with experiments that demonstrate the law of conservation angular momentum, then people sit on the swivel chair and hold the bicycle wheel. A visitor’s hair is used for the diffraction by hair demonstration, and when we show experiments about electrostatics, both the lecturer and a spectator swivel with a broom. One experiment that involves the entire audience is singing along with the lecturer as he plays the optical guitar.

We use the planetarium’s starry sky for laser shows and demonstrations. Although most of “Adventure Science” is held in the planetarium, most of “Adventure Optics” is done in the smaller lecture hall (the capacity is about 45 seats) so more members of the audience can take part in the experiments. Students assist me with experiments, making physics more attractive for them.

Our conclusion is very exciting: the reception to “Adventure Science” by the general public shows us that people are interested in the natural sciences. And, in my opinion, that is great news for all of us.

For more information, check the web sites www.hvezdarna.cz, www.udif.cz, zajfyz.physics.muni.cz, and feel free to contact me by email at ledvinka.stepan@gmail.com or ledvinka@hvezdarna.cz.
First Place: IPS/Eugenedies Script Contest

Michael Lion and the Star Pictures

Margie Walter
Iziko Planetarium, Cape Town
PO Box 61, Cape Town, 8000
Republic of South Africa
mwalter@iziko.org.za

I reckon that if you look in a modern dictionary, you may well find that Margie Walter's excellent script, *Michael Lion and the Star Pictures*, is the new definition of the word “delightful.” It put a smile on my face from the very first paragraph, and the smile stayed in place for a good while after I finished reading her script.

It's pitched just right for the young age group Margie targeted, and I'm sure we can all easily imagine children sitting in rapt attention as the charming characters chat about the star patterns in a way that's very accessible to kids. Every paragraph moves the story along, and there's no wasted time or words. The overall script length is good, too, as it leaves you enough time to do a star point out show afterwards to get the audience familiar with other constellations, too.

So, all in all, I am delighted and not at all surprised to recognise this as the First Place winning script for the 2007 IPS/Eugenides scriptwriting competition. Top quality does, indeed, get top recognition.

Sky Journey, the script from the second place winner, Jiri Holusa, will appear in December.

Steve Tidey
Chair, Script Contest Committee

Target audience: children aged 7 to 12 years.
In my country, the learners attend primary school from age 7 until approx age 12.
As many are from disadvantaged backgrounds, shows for high schools are inappropriate for primary school learners.
Simple terms are used, e.g. star pictures rather than constellations—my country has 11 official languages and it is impossible to accommodate all within one show. Any given school group is comprised of a variety of language speakers, with English understood by all, hence it is advisable to start with simpler terms and then progress to more complex terms, especially for young viewers.

Objective: An introduction to the concept of constellations. Identification of a few summer and winter constellations and their most prominent stars. Introduction to the idea that the night sky changes through the seasons.

Two readers: Reader 1 = Michael Lion
Reader 2 = Narrator, Canis Major, Orion, Leo, Bertie Bug

This is possible, as these characters never talk simultaneously. A slight voice change by the reader for each character creates character differentiation.

POS 2 = left of central projector; POS 1 = central projector; POS 3 = right of central projector

SM = star machine, SFX = sound effects
Settings: diurnal: 14 hrs; latitude: 34’S (red); annual: approximately 20 Nov (any year); precession: Not used
00:00 Fade red then blue cove to dark.  
SFX 40 sec happy music

Title POS 1

Happy lion PAN #25
Replace with sad lion PAN #25

Fade title
Girl A/S #37
Toys all other A/S's, including front
Fade girl A/S, add another toy A/S

Dim A/S low,  Lion still in PAN
Build up doll pics over A/S, but leave
POS 1 open

Doll POS 1, hands over eyes then fade
SFX running sound
Slow fade A/S
Fade all dolls and Happy lion
Building block POS 2
Lorry POS 3
A/S toys off
Teddies PAN #26 & # 36
   SFX few notes "teddy bears' picnic"
Fade sep toy pics

Bug POS 1

Fade lion in PAN & bug POS 1
01:56
Lion & bug Vert MM bottom, holding hands & looking up
Star field

Star blinks POS 1 (top vert slide)
animated then stops
   SFX magic tinkle sound
Star blinks again then stops
   SFX magic tinkle

   SFX longer magic tinkle
Lion & bug Vert mm move up
03:34 Diurnal CW 8 hrs
Lion & bug Horiz. MM RL
turn stars CW

SM level 3

NARRATOR:  Once upon a time ... in a land not so far from here ... there lived a little toy lion, called Michael. He was a handsome little fellow, but he was also a very sad toy lion. Why? Well, let me tell you Michael Lion's story.

He belonged to a little girl ... who had far too many toys. She had so many toys that she never bothered to play with them all. They just lay around in her playroom, getting all dusty and dirty. But that was just part of our little toy lion's problem. You see, there were no other lions, toy or otherwise, for him to talk to! Oh, there were dolls of all shapes and sizes in the playroom. They were all related, of course. Aunts and uncles, brothers and sisters, cousins ... but they wouldn't talk to Michael Lion. When he tried to be friendly with them, they would start crying and run away. Michael couldn't understand why they were frightened of him. Everyone knows that toy lions don't and won't bite anyone. There were other toys, of course, but nobody talks to a building block! That would be silly! And who ever heard of anyone talking to a toy lorry!

And of course teddy bears don't talk. Anyway, they are always off to the woods on some or other picnic.

But there was Bertie! Good old Bertie Bug! He always listened when Michael Lion spoke to him and understood everything that was said, but he never said a word. Not even a buzz or a squeak! Why? Because he was Bertie, the non-talking bug!

MICHAEL:  (big sigh)
At least I have you, Bertie ... (sigh) ... you're all family I have. I wish ... I wish I had a lion family somewhere though. Just look at all those stars, Bertie. Even the stars seem to be part of a big family. You know Bertie Bug, I wouldn't mind having a star family. I wish, I wish ... Did you see that? Did you see that, Bertie? That star winked at me! It did! It did! It must be a magic star! Or a wishing star! That's it! It's a magic, wishing star! Look, the star winked again! I'm going to make a wish! Close your eyes, Bertie and I'll close mine and then I'll make a wish. ... I wish, I wish Bertie and I ... can fly among the stars!

Hey, it worked! Hold on tight to my hand, Bertie! You might fall if you let go!

Weee ... Now I understand why bugs fly! It's wonderful! But even bugs can't fly this high! And look at all the pretty stars! Have you ever seen so many, Bertie?

CANIS MAJOR:  Wwof, woof.
Stop stars with Sirius high, Orion visible but Aldebaran below horizon

04:01 Constellation pic - Canis Major, Canis Minor (Taurus below horizon) Lion & bug PAN POS #26

Point out Canis Major
Point out Canis Minor

MICHAEL: What's that? Did you hear that, Bertie? It sounded like a dog! Up here? But I see only stars!

CANIS MAJOR: Woof, woof.

MICHAEL: Look there, Bertie! Dogs! Two star dogs! If they can bark, maybe they can talk! Can you talk, star dogs? Do you have names? My name is Michael Lion and this is my friend, Bertie Bug.

CANIS MAJOR: Woof, woof! My name is Canis Major and this is my little brother, Canis Minor.

MICHAEL: Canis Major and Canis Minor? Those are funny names. Are they special names?

CANIS MAJOR: Yes they are. Canis Major means big dog. That's me. I'm the big dog in the sky. Woof, woof. And Canis Minor means little dog.

MICHAEL: Mister Canis Major sir, you're not real dogs are you? Because I can see right through you! Right to the stars inside you! A ... are ... are you ... ghosts star dogs, sir? I'm not a very brave lion and ghosts frighten me.

CANIS MAJOR: Ha, ha ... no, little lion. I'm the constellation of Canis Major. And my little brother is the constellation of Canis Minor.

MICHAEL: Con ... ste ... tion. Constellation. What is a constellation, sir?

CANIS MAJOR: A constellation is like a star picture of a family of stars.

MICHAEL: And your family name is Canis Major?

CANIS MAJOR: That's right.

MICHAEL: My family name is Lion, but I don't have any family. There's just Bertie Bug and me. Do you think I might have a star lion family in the sky somewhere, mister?

CANIS MAJOR: Maybe, maybe ...

MICHAEL: By the way, why are you and your brother upside down?

CANIS MAJOR: Oh, the reason for that started a long, long time ago, in a land very far from here ... on the other side of the world, in fact! And it was such a long time ago, that people didn't even have watches and calendars like you have today!

MICHAEL: I don't wear a watch, because my fur gets in the way ... but mister Canis Major, how did the people of long ago know what the time was then?
<table>
<thead>
<tr>
<th>SM ACW, stars off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move sun with glow across sky</td>
</tr>
<tr>
<td>cardinal points on</td>
</tr>
<tr>
<td>06:30 Point out AM, NOON, PM</td>
</tr>
</tbody>
</table>

Start evening seq., twilight, sun off, stars on

Moon on Moon off after moon seq.
Annual off then fade to dark
no star field

SM level 2
dim PAN

SM full moon moves across, then fade
bright stars only
turn star field ACW

Planting pic POS 2

07:33 Lightning A/S
SFX lightning & thunder

Rain pic POS 3
SFX rain sound
fade POS 2 & 3 after awhile
fade cardinal points

Constellation pics - POS 1, 2, 3

**CANIS MAJOR:** To tell the time during the day, they looked to see where the sun was in the sky...

**MICHAEL:** Oh, that's easy. When the sun is low down on that side of the sky, it's morning ... and when the sun is high in the sky, it's the middle of the day ... and when the sun is low down on this side of the sky, it's evening ... but how did they tell the time at night when one can't see the sun?

**CANIS MAJOR:** To tell the time at night, they looked to see where the moon and stars were in the sky. Remember, the moon doesn't really move this fast across the sky. I'm making it move faster.

**MICHAEL:** Okay, so this was how their night-time watch worked ... and what did they use as a calendar?

**CANIS MAJOR:** They used the stars as their calendar!

**MICHAEL:** Really? A star calendar? Wow!

**CANIS MAJOR:** When people saw certain stars in the night sky, they knew they would soon have to plant their fields, so that they could have food ... and when they saw certain other stars in the night sky, they knew that it would soon start to rain.

**MICHAEL:** Oh! That gave me a big fright! I'm really not a very brave lion ... Mister Canis Major, there are so many stars in the night sky! Didn't the people get mixed up? I would!

**CANIS MAJOR:** No. They looked for patterns in the stars and grouped them together and by joining the stars with play-play lines, like a large join-the-dot puzzle in the sky ...

**MICHAEL:** Oh, I know that game!

**CANIS MAJOR:** ... they imagined they saw all kinds of wonderful shapes of people and animals in the night sky!

**MICHAEL:** Constellations!

**CANIS MAJOR:** Yes, that's right. And to remember the constellations better, they gave them names and made up stories about them.

**MICHAEL:** But why are they upside down?

**CANIS MAJOR:** From that far away land, on the other side of the earth, the people saw the constellation pictures the right way up... but because you live way down here ... you see the constellation pictures upside down!
MICHAEL: As if I'm standing on my head!

CANIS MAJOR: Yes, that's right Michael Lion. We know the names these people from long ago gave the constellations, in fact we still use those names today. And we know the stories they made up about them.

MICHAEL: Did they make up a story about you and your brother as well, mister Canis Major?

CANIS MAJOR: Oh yes, they did.

MICHAEL: Will you tell me your story, please? Bertie and I love stories.

CANIS MAJOR: Long, long ago, in this far away land, there lived a mighty hunter called Orion. He was very strong and so tall, it was said that he could walk through deep water without getting his head wet.

MICHAEL: Wow, that is tall!

CANIS MAJOR: Everyone admired him and told him what a great hunter he was, but all this admiration made him want to show off.

MICHAEL: That's not a very nice thing to do.

CANIS MAJOR: One day he bragged that he was such a good hunter that he could kill all the animals on earth and started doing just that.

MICHAEL: Oh no! Lions as well?

CANIS MAJOR: Oh yes, Michael. Lions as well!

MICHAEL: What happened then?

CANIS MAJOR: When Gaia, the goddess of the earth, heard what Orion was doing, she got very, very angry! Something had to be done, and quickly, so she gathered all her animals around her to talk about the problem.

MICHAEL: And... and? What happened then? Could they fix the problem?

CANIS MAJOR: When she saw the little scorpion, with its poisonous sting... she carefully thought about what to do.

MICHAEL: Oh good! I'm pleased! Orion was very naughty!

CANIS MAJOR: Orion would be so busy hunting animals, that he would forget about the smaller creatures of earth! So Gaia sent the little scorpion to save the animals from being hunted by Orion. The scorpion found Orion fast asleep, as he was very tired after yet another hunt.
BLACK HOLES
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MICHAEL: And then? And then?

CANIS MAJOR: ... and with one sting from his deadly tail, the little scorpion poisoned the mighty hunter!

MICHAEL: Phew! That was close! At least the animals and lions would be safe again!

CANIS MAJOR: Now Orion had another admirer, a goddess called Aurora ... who, every morning as the sun came up, painted the sky beautiful shades of orange and pink. When she heard that Orion was dying, she was very upset, because she loved him very much. She went to the doctor of the gods and begged him to heal Orion.

MICHAEL: And did he? Did the doctor fix Orion?

CANIS MAJOR: Oh yes. He agreed, only if Orion never came down to earth again to kill animals. So Orion was healed and sent away, with his hunting dogs, to the sky forever. Gaia was very pleased that Orion could no longer kill earth's animals, but to be absolutely sure, she put the scorpion in the sky to watch over Orion.

MICHAEL: Oh, I'm am pleased to hear that!

CANIS MAJOR: Aurora missed Orion very much. When she painted the morning sky and looked up to see Orion so far away, she cried and cried. Her tears became the morning dew.

MICHAEL: Oh, that's so sad. But at least the animals and lions were saved, hey Bertie!

CANIS MAJOR: And that ...is the end of my story.

MICHAEL: Hey!

MICHAEL: Where did mister Canis Major go? He was just talking to me! Where could he be?

ORION: My hunting dogs are by my side, where they always are.

MICHAEL: Who said that? Are there more talking dogs in the sky?

ORION: I did.

MICHAEL: (gasp) Oh, you must be mister Orion, the mighty hunter! Mister Canis Major told me all about you!

ORION: Yes I am the constellation of Orion.

ORION: And who are you?
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SFX ping sound</strong></td>
<td>MICHAEL: I'm Michael Lion, sir and this is my friend Bertie Bug. He can't talk though, so don't think he's rude if he doesn't say hello ... You've got pretty stars in your belt, sir.</td>
</tr>
<tr>
<td><strong>12:51 Point our Orion's Belt</strong></td>
<td>ORION: Yes. If you are looking for me, you must always look for these three stars in a row. As you said, they are my belt stars.</td>
</tr>
<tr>
<td><strong>Point out dagger</strong></td>
<td>MICHAEL: Okay. Orion's Belt. Now remember that, Bertie. Orion's Belt.</td>
</tr>
<tr>
<td><strong>Point out Rigel etc</strong></td>
<td>ORION: And here is my dagger.</td>
</tr>
<tr>
<td><strong>Point out Betelgeuse</strong></td>
<td>MICHAEL: It looks very dangerous!</td>
</tr>
<tr>
<td><strong>13:36 Point out from Belt to Sirius</strong></td>
<td>ORION: Oh, I don't use it any more, of course. It's just for decoration these days. These two stars will show you where my knees are ... and these two stars, over here, are my shoulders. Can you see that this star looks slightly reddish?</td>
</tr>
<tr>
<td><strong>Switch on constellation pics Canis Major &amp; Minor</strong></td>
<td>MICHAEL: Yes, sir. I can. Did you hurt yourself?</td>
</tr>
<tr>
<td><strong>Diurnal ACW to 4 hrs</strong></td>
<td>ORION: Yes, I did. A long time ago, during a hunt in fact. It has healed now, but as you see, the red star shows that the scar is still there.</td>
</tr>
<tr>
<td><strong>Fade lion &amp; bug Vert MM bottom</strong></td>
<td>MICHAEL: Mister Canis Major, your big hunting dog, told me your story. It was such a sad story. By the way, where are your hunting dogs, sir?</td>
</tr>
<tr>
<td><strong>Scorpion constellation pic rises</strong></td>
<td>ORION: Oh, they are here by my side, as always. If you look along my belt ... in this direction ...</td>
</tr>
<tr>
<td><strong>Point out Scorpius</strong></td>
<td>ORION: ... you'll see this very bright star over here.</td>
</tr>
<tr>
<td><strong>Still turn star field ACW</strong></td>
<td>MICHAEL: It looks like the brightest star in the whole, wide night sky!</td>
</tr>
<tr>
<td></td>
<td>ORION: Oh, it is. It's known as Sirius, the dog star, and that is where you'll find my big, hunting dog, Canis Major. Look.</td>
</tr>
<tr>
<td></td>
<td>MICHAEL: Oh yes! I see him! Hello again mister Canis Major and little mister Canis Minor. By the way, where is the scorpion, mister Orion? I don't see any scorpion and there was a scorpion in your story.</td>
</tr>
<tr>
<td></td>
<td>ORION: Oh yes, he's in the sky as well. In the summer months you'll see my dogs and I high in the night sky, but as winter starts, and we sink lower and lower in the sky ...</td>
</tr>
<tr>
<td></td>
<td>ORION: (muffled voice) ... the scorpion starts to rise on the opposite side of the night sky. Remember, in winter you'll see the scorpion, called the constellation...</td>
</tr>
<tr>
<td>Text</td>
<td>Action</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td>&quot;constellation of Scorpius&quot; POS 3 - fade after awhile</td>
<td>Text: of Scorpius, high in the night sky. Look for this curve of stars that form the scorpion's tail.</td>
</tr>
<tr>
<td>SFX ping sound</td>
<td>MICHAEL: Oh yes, now I see them. Look at the little cross of stars at the end of his tail.</td>
</tr>
<tr>
<td>Const pics Orion &amp; dogs off</td>
<td>ORION: (muffled voice) Yes, that's his sting!</td>
</tr>
<tr>
<td></td>
<td>MICHAEL: Okay. Now I understand how the sky, star calendar works. Mister Canis Major told me about it as well. I'll see Scorpius in winter and ...</td>
</tr>
<tr>
<td>15:58 Diurnal ACW till 8 hrs so Orion up again, then stop</td>
<td>ORION: (muffled voice) And when I appear again in the early evening sky, summer is on its way.</td>
</tr>
<tr>
<td>Fade up lion &amp; bug Vert MM bottom</td>
<td>MICHAEL: My, did you hear that, Bertie? That's how the sky, star calendar works. Mister Orion sir, do you think there might be a star lion family for me somewhere in the sky?</td>
</tr>
<tr>
<td>Lion &amp; bug Vert MM moves up</td>
<td>ORION: (no longer muffled) Maybe. Why don't you go and look around a bit. There are many constellations in the night sky. Maybe there's a lion up here somewhere.</td>
</tr>
<tr>
<td>Lion &amp; bug Horiz. MM LR turn stars ACW</td>
<td>MICHAEL: Okay, I will. Come Bertie Bug. Oh, before I go mister Orion sir, may I please be so bold and say, please, please don't kill any animals and lions again.</td>
</tr>
<tr>
<td>Stop turning stars when Leo up no constellation pic</td>
<td>ORION: Don't worry, Michael Lion. I've learned my lesson. I'll never kill anything again. I promise.</td>
</tr>
<tr>
<td>Constellation pic Leo</td>
<td>ORION: Good bye and good luck.</td>
</tr>
<tr>
<td></td>
<td>CANIS MAJOR: Woof, woof.</td>
</tr>
<tr>
<td></td>
<td>MICHAEL: Hold tight, Bertie Bug. Here we go again. Do you think I'll find a star lion family up here somewhere? I hope so. I'm not sure where to start looking, though. There are so many stars!</td>
</tr>
<tr>
<td></td>
<td>LEO: (softly) Roar.</td>
</tr>
<tr>
<td></td>
<td>MICHAEL: Did you hear that, Bertie? I thought I heard something.</td>
</tr>
<tr>
<td></td>
<td>LEO: (slightly louder) Roar.</td>
</tr>
<tr>
<td></td>
<td>MICHAEL: My ears must be giving me trouble or something, because that sounded like a roar! It can't be!</td>
</tr>
<tr>
<td></td>
<td>LEO: (loud) Roar!</td>
</tr>
<tr>
<td></td>
<td>MICHAEL: It is! It is! It is a lion I hear! Can you hear it, Bertie? A lion! Where, where are you, lion?</td>
</tr>
<tr>
<td></td>
<td>LEO: Here I am.</td>
</tr>
</tbody>
</table>
A Match Made in Heaven
Digital STARLAB powered by Starry Night Software

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www.starlab.com * www.sciencefirst.com
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>16:30</td>
<td>Point out Scorpius' tail</td>
</tr>
</tbody>
</table>

**MICHAEL:** Oh! Oh! Look, Bertie! A lion! A big lion in the sky for me! Oh, my wish has come true! A star lion! Oh, Bertie!

**LEO:** Who are you, child? Do you have a name?

**MICHAEL:** I'm Michael Lion, sir, and this is my friend Bertie Bug. Don't think he's rude if he doesn't say hello. He just can't talk. Do you have a name, sir?

**LEO:** Of course I have a name. My name is Leo. I am the constellation of Leo ... the mighty lion in the sky and king of all the beasts.

**MICHAEL:** Ooo! I'm so, so very, very pleased to meet you, your majesty. I can't tell you how pleased I am! My wish has come true!

**LEO:** And what wish would that be, little fellow?

**MICHAEL:** I don't have any family, sir and I thought that if there was a star lion somewhere up in the night sky, he could be my family. I don't suppose you ... you will be .... (sigh) No, that's too much to ask. You being a king and all.

**LEO:** Be your family? But I am your family, little Michael. I'm family to all the lions on earth!

**MICHAEL:** You are? You really are my family?

**LEO:** Why yes, child. I am.

**MICHAEL:** Oh dear, oh dear. That's great!

**LEO:** And I'll always watch over you. If you need me, look for me high in the autumn night sky.

**MICHAEL:** Autumn. That's when the leaves on the trees go brown and start falling. I'll remember that. Then I can show those silly dolls in the playroom my lion family in the sky! By the way, how will I find you, sir?

**LEO:** Just look for this back-to-front, upside-down, question mark of stars in the night sky, and that is were I'll be. Can you see them?

**MICHAEL:** I can, I can. Yes, I see the back-to-front, upside-down, question mark of stars.

**LEO:** And this bright star, is my heart.

**MICHAEL:** My ... you must be a very great and noble king, to have such a bright, shiny heart! And to think you're my family! Wow!

**LEO:** Thank you, Michael Lion. I do try my best to be a good and just king.
MICHAEL: Is there a story about you as well, sir?
LEO: Oh yes, child.

MICHAEL: Will you tell me your story, sir? I should know my family history, you know.
LEO: Of course. ... Long, long ago, I used to live on the moon ...

MICHAEL: On the moon? Really?
LEO: Yes, I liked living there, but I was young and irresponsible. One night I went down to earth as a shooting star ...

MICHAEL: Oh, wow!
LEO: ... and caused so much trouble there, that I was put back in the sky forever. And that is where I've been ever since.

MICHAEL: Don't you get lonely, sir?
LEO: Oh, no, I don't mind. From here I can watch all the animals in my kingdom.

MICHAEL: Like a big star, a watch-lion! Wow!
LEO: Something like that. But off with you now, Michael Lion. There are some matters in my kingdom that urgently need my attention. Just remember, I am your family and I will always watch over you. If you need me, look for me high in the autumn night sky.

MICHAEL: Okay, sir. I'll remember.
LEO: Good bye, child.
MICHAEL: Good bye, good bye and thank you very much. It was great meeting you, sir. Bye. Come Bertie, let's go home. Oh Bertie Bug, I can't tell you how happy I am. I feel like singing ... la, la, la ... Just wait till I see those silly dolls again. Boy, do I have a thing or two to tell them! (roar) (sigh) Oh Bertie, just think. Not only do I have a star lion family in the sky, but he is a king as well! Do you hear that, dolls? That's right! A king! Just think, a lion king as my family! I must be royalty then! Wow! I'll never let those silly, playroom dolls upset me again! Hey, and seeing that I'm royalty, you can call me sir from now on, Bertie.

BERTIE BUG: No! I will not!
MICHAEL: Bertie? You said something? Bertie! You did say something! And I thought you were a non-talking bug!

BERTIE BUG: Well, you're not the only one who's wish
end
Michael Lion has forgotten what he learned about Star Pictures!
Can you help him?

A star picture of a family of stars is called a
co__t__l_a__t__a__n

Please colour us in!

The star picture of the big hunter in the sky is called
O__n
We see this star picture in Summer

The star picture of the lion in the sky is called
L__
We see this star picture in Autumn

Do you know the names of two reddish colour stars?
(answers are on this worksheet)

A__

B__

Do you think there is a star picture of Bertie Bug in the sky? Yes No

Iziko PLANETARIUM
25 Queen Victoria Street, Cape Town. 021 481-3900
It was with great pleasure that the International Planetarium Society celebrated and honored seven of its outstanding members at its 2008 Conference in Chicago, Illinois. This year’s conference theme was “Exploring the Edge.” These seven members have assisted IPS for many years in not only exploring but also navigating the “edge” to the benefit of all colleagues in our international community.

2008 IPS Service Award
The IPS Service award is the highest expression of appreciation and gratitude that the IPS ever gives to its members. An IPS Service Award is bestowed, from time to time, by the Society upon an individual or institution whose presence and work in the planetarium field has been, through many years of perseverance and example that were above and beyond any expectations, an inspiration to the profession and its members.

The 2008 IPS Service Award recipient:

**Shawn Laatsch**  
*`Imiloa Astronomy Center of Hawai`i*

The following remarks were composed and presented by Martin George as Shawn received his award:

“Shawn has been a member of the IPS for many years while working at several different planetariums, most recently taking up a position at the `Imiloa Planetarium in Hawai`i.

“Shawn has served our Society in an exemplary way. He was nominated for the position of treasurer in 1996, at the IPS conference in Osaka, and commenced his new role in January 1997. Remarkably, he has held that position ever since, working tirelessly for the Society for the past eleven and a half years.

“The job of treasurer and membership chairman is an onerous one. For example, dealing with hundreds upon hundreds of memberships around the world, Shawn has naturally had to deal with everything from simple membership subscriptions to problems relating to different currencies and methods of payment. At some IPS conferences, the task has been quite daunting as both members and non-members arrive at the registration desk, and it is always very important to ensure that IPS members receive the advantages of membership to which they are entitled.

“Indeed, the work of any officer often takes him or her away from many of the desirable parts of the main conference proceedings, and in that regard it is notable that this conference here in Chicago is the sixth for which Shawn has been an officer.

“These, though, are some of the more mechanical tasks of Shawn’s position. There is far more to being treasurer, because a treasurer must keep track of all types of financial aspects of the Society. Investment of the Society’s money, the costs of producing and mailing the Planetarian, and reimbursements for travel and accommodation are just a few examples.

“Also, as an officer, it is important to continue to be involved in all aspects of the Society’s operation. Hardly a day goes past when emails are not exchanged between the five officers, and it is not uncommon for a large number of emails to be circulating on several different topics at the same time.

“Shawn’s almost daily input on the running of the Society has been extremely important over more than a decade, representing more than a quarter of the time that our Society has been in existence.

“Shawn has been particularly keen to ensure the smooth running of our Star Partners and
2008 IPS Technology and Innovation Award

This year a new award was initiated and presented to one of our members. The IPS Technology and Innovation Award was designed to recognize an individual, institution or commercial vendor whose technology and/or innovations in the planetarium field have been, through the years, utilized or replicated by other members and/or planetariums. This individual has had a broad, deep, and concrete effect on the profession and in its development.

The first IPS Technology and Innovation Award recipient:

Steven T. Savage
Sky-Skan, Inc.

The following remarks were composed and presented by Ian McLennan as Steve received this award at the IPS Awards Luncheon:

“The person we are honoring today with the IPS Technology and Innovation Award is one who is well known to literally everyone in the planetarium profession. For over 40 years, he has traveled far and wide—and has been involved with some of the most significant technical advances in the entire field.

“Steven T. Savage first caught the planetarium ‘bug’ as a young teenager in suburban Rochester, New York. One of his science teachers, Jerome deGraff, brought Steve to the Strasenburgh Planetarium one day (Jerry was a part-time teacher at the planetarium), and Steve was fascinated, mesmerized and thoroughly hooked, both by the cosmic array that was on display, and by the technical wizardry that brought it to life under the giant dome.

“Steve’s potential contribution was recognized even at this early stage, and he actually became a part-time—and valuable—staff member of Strasenburgh Planetarium at the tender age of 15. In fact, Steve contributed greatly to the more than 100 technical innovations that could be traced back to the Strasenburgh—including a wide array of ingenious special effects and new control processes and by simply knowing how to either build or fix things. The Strasenburgh was the world’s first computerized planetarium, and Steve became the first person to learn how to program the mammoth Digital Equipment Corporation PDP-8 computer that took up nearly all the space in the planetarium control room.

“Through his friendship with John Paris, technical director of the Strasenburgh and one of the founders of Sky-Skan, Inc., Steve became one of the three employees of this modest special effects company. When John eventually decided he wanted to retire, Steve offered to buy the company—a monumental leap of faith if there ever was one.

“He moved the corporation to New Hampshire, and proceeded, over time, to turn it into a company that pioneered special effects laser discs, SPICE multi-media automation systems, and the first true full-dome digital video system.

“He has gone beyond the world of planetariums to introduce new technologies and production techniques in a variety of other applications, including theme pavilions and world expositions. He has gone on to introduce the SkyVision production tool, DigitalSky planetarium multi-media system and the world’s first fulldome digital video 3-D stereo system.

“Steven Savage is a tireless, energetic and peripatetic traveler whose hands-on approach to running his company routinely sees him bounding regularly from one country to another, covering all six continents in any given year. At last count, he had logged more than 3 million miles on one airline alone. Those who know and work with him, including his many loyal customers, appreciate the fact that Steve is always—and we mean always—available for personal advice, technical consultation, problem solving, out-of-the-box thinking and for squeezing in just one more phone call or Skype chat from some strange city at an unforgiving hour. He can instantaneously tell you what time it is in just about any city in the world.

“Those who know and care about Steve worry about his relentless travel schedule, his dreadful diet, and sometimes even his appearance after pulling yet another all-nighter—and getting another show opening, just in time. But he seems to thrive on it, and probably wouldn’t be able to operate any other way, even if he tried.

“When your IPS Council met last year in Rio de Janeiro and accepted the nomination of Steve Savage as the recipient of this year’s Award for Technology and Innovation, it was stipulated by the nominator and accepted by the Council that although Steve Savage and his company Sky-Skan, are synonymous—this award is a personal one, to recognize and celebrate the integrity, sacrifice, commitment, boundless energy, vision and ingenuity Steve has brought to his work, and in turn, to the profession we all love.”

2008 IPS Fellows Awards

Five new IPS Fellows were inducted in 2008. Their presence in the Society and their work in the planetarium field has been, steadily through the years, an inspiration to the profession and IPS members. These individuals have had a broad, deep, and concrete effect in the profession and its development.

In order to be named as a Fellow of the International Planetarium Society, a member must have continuous active membership in good standing in IPS for at least five years and substantial contributions in at least two of the following respects:

• Serving IPS in elective office, diligent and/or devoted committee work, and the organization of conferences and meetings.
• Relevant and significant publications and/or conference presentations.
• Cooperation with professional societies, or—
ganizations and groups which bring attention to the importance of planetariums’ existence.

- The development of new methods in the planetarium field.

- The five new IPS Fellows are:

  **Agnès Acker**  
  **Observatoire de Strasbourg**

  Agnès Acker founded the Strasbourg Planetarium in 1980. She organized the first European conference in 1984, in Strasbourg (Conseil de l’Europe), and the basis of the Association of French-Speaking Planetariums (APLF) was born on this occasion. The French planetariums met then in Paris in 1985, where APLF was created. Agnès was elected as president, and has been regularly re-elected since that date. She attended her first IPS conference in 1990 and, as president of APLF, serves on Council as the APLF Affiliate Representative. She has been a regular presenter at IPS and APLF conferences and is a staunch supporter of IPS in France. Agnès also twice facilitated APLF’s hosting of a European Meeting for Small and Portable Planetariums during its national meeting.

  **Suzanne Gurton**  
  **Astronomical Society of the Pacific**

  Since 2000, Suzanne Gurton has been the dynamic and extremely effective education manager at the Astronomical Society of the Pacific (ASP) and has spearheaded several major national and international educational initiatives that benefit the entire planetarium community. Another important project she heads is “Astronomy from the Ground Up,” a major effort to train education staff at small planetariums, museums, nature centers, and environmental education centers to do more and better astronomy as part of their programs. She also heads the ASP’s “Night Sky Network.” She has been the liaison between the ASP and the planetarium community, attending and doing workshops at IPS and regional planetarium conferences.

  **Lars Petersen**  
  **Orion Planetarium**

  Lars Petersen has been an active member of both IPS and the NPA for over 10 years and is deputy director on the board of NPA. He has been a regular contributor, presenting interesting papers, to several IPS and NPA conferences. He hosted a well-attended NPA Conference in Jels in 2005.

  **Aase Roland Jacobsen**  
  **Steno Museum**

  Aase Roland Jacobsen has been an active member of both IPS and the Nordin Planetarium Association (NPA) for over 10 years and is director on the board of NPA. She has been a regular contributor, presenting interesting papers, to several IPS conferences and NPA conferences. She assisted Ole Knudsen in hosting a well-attended NPA Conference in Aarhus 10 years ago.

  **Raymond Worthy**  
  **Stargazer Planetariums**

  Ray Worthy has been an active member of IPS and the British Association of Planetaria (BAP) for over 15 years and continues to mentor fellow colleagues all over the world with regard to the technology of building planetarium projectors and maintaining older projection systems. He is the founder of his own company, Stargazer Planetariums, which provides the planetarium community with his original and unique designs of portable domes. Ray has served as a vital member of the IPS Portable Planetarium Committee for more than 15 years.
One-man band

Astronomer, Technician, Administrator, Child Wrangler...

You do a LOT with a little. So must your projection system.

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SOLO 1050x1050 full-dome projection, available now from Sky-Skan.
One tiny computer file. Can it change a kid’s life?

Sky-Skan maintains a research department to bridge the world of science/technology and the often hectic world of our definitive theater customers.

We access publicly available data, sort through it, and package it for our customers to easily update their theater software. They can add their own data as well—and distribute it to the family of definite theaters on the DigitalSky Academy (DSA) forum.

These ongoing updates make a big difference to our customers seeking to inspire young people to pursue science and technology careers.
AM ESO announces information about exoplanet Gliese 581 c.

PM The world reads descriptions about Gliese 581 c.

description

The orbit of Gliese 581 c may be within the habitable zone, the area where the heat from nearby star Gliese 581 is able to provide liquid water.

AM In California, Paul Buehler updates his definitive theater with a file from Sky-Skan.

PM Glendale Community College Planetarium students experience Gliese 581 c.

“The ability to show how this exoplanetary system might look in near real-time (as if we could fly the planetarium directly to the system itself) cannot be understated. It is vital to how we work here and to how we teach our students.”

Paul Buehler, Glendale Community College Planetarium
Full-size definiti® theater capabilities: now available to go.

Not all portable planetariums make you compromise on capabilities. The new definiti PD II features Sky-Skan’s complete DigitalSky 2 software. So forget about whatever show limitations you might expect from a portable system. In fact, because the PD II runs the full version of DigitalSky 2 (and its plug-ins), it makes a great second theater to compliment a full-size definiti system.

The definiti PD II is a portable projection system with a powerful graphics computer and projector in one 32” tall unit. A laptop and 5.1 speaker system are also included, along with a durable custom travel case. Best of all, the PD II includes all the plug-ins—at no extra charge—that make DigitalSky 2 the most expandable full-dome software anywhere. Project in up to 9m (30 ft) domes (don’t forget that we sell a variety of portable domes if you need one).

No matter where you set up a definiti PD II, you’ll be using the same tools that the world’s top full-dome theaters enjoy. For more information contact Sky-Skan at SkySkan.com.
IPS 2008 In Pictures

1. Kenan Bromann from Planetarium Hamburg and the view from the conference hotel windows. • 2. Mac Attack: from left, Bob Patterson, Alex Betts, and Donna Cox, all from NCSA, and Ian McLennan, Edmonton. • 3. From left, Wendy Ackerman, John French and Chuck Rau catch up on what’s up. • 4. Alexandre Chereman, Rio di Janeiro, always on the job. • 5. The Kuwaiti team and Michael Magee, Tucson, enjoying Chicago’s famous wind. • 6. Laura Misajet, Seiler Instruments, also on the job. • 7. Jason Statham, Ash Enterprises (front) and Mike Murray, Clark Planetarium (rear), on their way to the Adler. • 8. Alan Dyer, Calgary, on Canada Day. • 9. Takayuki Ohira and his Megastar. Photos by Tim Horn (1, 2, 3, 6, 7) and Ian McLennan (4, 5, 8, 9)
2. Tom: Tom Casey from Home Run Pictures and Tom Kwasnitschka.  
3. Delegates enjoy the Stereo3D demo by Sky-Skan, aided by Infitic glasses.  
4. From left: Tania Marques, Björn Voss, David Beining, Katarina Przybyl  
5. Von Del Chamberlain  
6. Johan Gijsenbergs  
7. IPS officers and chairs, from left: Thomas Kraupe, Martin George, Susan Button, Jon Elvert. Photos by Tim Horn (2, 4, 6, 7); Ian McLennan (5); John Hare (1); and Martin Ratcliffe (3)

Go to ips2008.org for more great conference photos
It is difficult for me to believe that my presidency is almost over! So much to do and so little time! The officers and I have accomplished a great deal and continue to prepare for further improvements in member services and adjustments in the Standing Rules that will assure that the business of IPS runs smoothly.

During my president’s report at council I mentioned the following items as a review of progress to date:

**IPS Officers’ Meetings**

IPS officers held two meetings during the last two years on their own initiative and with their own funding. These meetings were held outside of, and to prepare for, the 2007 and 2008 Council meetings.

The first meeting was held in Hilo, Hawai’i, where we also met with the Mauna Kea Observatories Outreach Committee. One of the fruits of meeting with this group was another networking opportunity.

IPS was asked to participate in an Astronomy Roundtable for the Physics-Astronomy-Math (PAM) division of the Special Libraries Association (SLA) at their annual conference in June 2008 in Seattle, Washington. Karrie Berglund served as our representative and gave a brief presentation about the IPS; her comments appear later in this column.

The second officer’s meeting was held in conjunction with the Middle Atlantic Planetarium Society’s annual conference in Schenectady, New York. MAPS members were pleased to get a bit more of an international flavor to their conference. With Past President Martin George and President-Elect Tom Mason attending there was never a dull moment! IPS officers spent many late evenings after conference activities working on IPS business and we accomplished a great deal. Lee Ann Henning and Shawn Laatch Skyped in to round out the team.

**President’s Message Video**

The creation of a video of the president’s message, produced for IPS affiliate meetings, proved to be quite a challenge for me because my home video camera was not up to the task! With the help of a local videographer and Jack Dunn, council representative for the Great Plains Planetarium Association, a miracle happened and a nice video was produced.

Then another miracle happened when Jack and Agnès Acker, council representative for the Association of French-Speaking Planetariums, created a version of the video where I was speaking perfect French! They made it look so easy to work long distance over the Internet that it made me think that similar videos could be done for all of the languages representing IPS! It has been suggested that, for the next video, perhaps a low-resolution version could also be placed on the IPS website.

**2012 Conference Sites**

Finding Conference 2012 sites was another challenge and I am very pleased to report that we have three fine bids again this year: the Irene W. Pennington Planetarium in Baton Rouge, Louisiana, represented by Jon Elvert; the Morrison Planetarium in San Francisco, California, represented by Ryan Wyatt; and the Astronef Planetarium in Saint-Étienne, France, represented by Jacques Guarinos. Soon you will be hearing more about these bids from articles in the *Planetarian*.

**IPS Committees**

Most IPS committees have been hard at work, some more than others! Jon Elvert, chair of the Outreach Committee, was selected to serve as our institutional “single point of contact” for communication between the IPS and the International Astronomical Union for International Year of Astronomy 2009. Jon is doing a fantastic job of keeping his committee’s web page updated with all the latest results of this committee’s efforts; see www.ips-planetarium.org/or/comm/outreachcom.html.

As part of the Outreach Committee’s efforts to assist planetariums in developing countries, Jon and David Weinrich have worked closely to orchestrate the “Ghana Project” of building the first planetarium in Ghana. You will be amazed to read more about that in an article in this journal in the future.

Speaking of promoting planetariums, we can now raise the status of planetariums in...
general through our new IPS Publicity Coordinator Jacques Guarinos. He is working closely with me to increase visibility of your initiatives and we are, in the light of the recent rash of closings, trying to list proactive steps for keeping planetariums viable and also produce a document with a list of points explaining the importance of planetariums that can be attached to IPS president letters of support for planetariums under the threat of closing.

The Fulldome Committee has been revitalized and is extremely important to IPS as we strive to be inclusive in our services to facilities going to digital full-dome. It is imperative that we examine the latest research in digital projection in the fields of education as well as entertainment to enhance our understanding of the full capabilities of this technology. A new IPS partner organization, the association of Immersive Media Entertainment, Research, Science and Art (IMERSA), was announced at the Fulldome Summit during this year’s conference. IPS members can benefit from the research, development and resources of this group. See more in Ed Lantz’s Digital Frontiers column on page 57.

Jon Bell stepped down, after many years service, as chair of the Awards Committee and Lars Broman volunteered to fill this position. He is doing an admirable job, as you will see. Thank you Lars for volunteering for yet another vital service to IPS. See the 2008 IPS Awards announcement at the end of this column, and don’t forget to send Lars nominations for future awards at Lbr@teknomandlse.

International Relations Committee: Martin George is a marvelous ambassador for IPS during his world travels as past president and chair of this committee. I am grateful for his continued hard work on this front. He has promised to continue contributing news of his travels and outreach efforts in this journal in the future.

Education Committee: Brock Schroeder has changed jobs and stepped down as chair of this committee. I am delighted, however, to announce that Jack L. Northrup, director of the Martin Luther King Jr. Planetarium, Omaha, Nebraska, has volunteered to “step up to the plate” as the new chair of this committee and is already making progress in getting committee members motivated about the vital work of this committee. Look for news on that committee’s web page soon, and see an interview with Jack in the Education Horizons column on page 60.

**Face to Face Gets Work Done**

Communication with affiliates and committees can be a bit shaky at times. Conclusion: There is nothing like face-to-face meetings for getting work done!

Through my attendance at three conferences (the Western Alliance, Triple Conjunction, and Canadian Association of Science Centers), I was able to meet with members from most of the North American affiliates. I was especially delighted to meet with Western Alliance and Canadian Association members because I had not met with them before.

The CASC meeting was quite different in that it was not centered on planetariums. The exciting part was that there was a huge focus on interactive sessions with conference participants actively involved in problem solving. However, I could also see that it is important that the profile of IPS and planetariums be raised in that organization. There are few stationary planetariums in Canada but many portable domes; both venues are doing good work.

As you know from previous columns, European meetings for small and portable planetariums will be held in 2008 (Portugal) and 2009 (Poland) due to the success of the 2007 meeting in Bratislava.

All in all, aside from regular housekeeping items (revision of documents and updates on the website), your officers, affiliate representatives and committee members have continued to served IPS members well.

**Into the Library World**

An Astronomy Roundtable for the Physics-Astronomy-Math (PAM) division of the Special Libraries Association (SLA) was held during the association’s conference June 15-18 2008 in Seattle, Washington.

Karrie Berglund reported on this roundtable with the following comments.

“I’d say there were about 60 people total at the roundtable, and they were a really nice group. At the end each person stated his/her name and affiliation. I didn’t write down every institution represented, but here’s a smattering: European Southern Observatory, National Radio Astronomy Observatory, National Optical Astronomy Observatory, United States Naval Observatory, the Adler Planetarium, Space Telescope Science Institute, Lowell Observatory, and the Massachusetts Institute of Technology/Haystack Observatory.

“My talk went well. I spoke about IPS and our goals and objectives for about 10 minutes, then took some questions and comments for another five minutes. At the very beginning I asked how many folks were familiar with IPS, and about 1/4 of the people raised their hands. No one besides me is an IPS member.”
Karrie listed interesting items that came from that meeting:
- MIT/Haystack Observatory Librarian Madeleine Needles mentioned that she collaborated with Loch Ness Productions on a successful project.
- There were several questions asked about digital projection products and techniques.
- Karrie encourage the attendees to download Stellarium and experiment with it, since one of the ESO folks had mentioned it and Fabien Chereau, the original Stellarium developer, is now working on Stellarium fulltime for the ESO.

A brief discussion took place about what the libraries are planning to do for IYA, aside from posters. Most do not have firm plans yet. The USNO will be open to the public for some special observing sessions, and Liz Bryson said they’ll be doing some special activities, but the exact activities have not yet been determined. Liz said that she’d contacted John Stoke at STScI about helping with library activities for IYA, as the SLA had not been contacted about participating. Apparently the IYA working group is working with the American Library Association on this. Liz will be able to give us more details; her email address is Bryson@CFHT.Hawaii.edu.

Bruce Mason from the University of Oklahoma and the American Association of Physics Teachers is the director of comPADRE, a digital resource for astronomy and physics education (www.compadre.org/portal). He was familiar with Stellarium and asked me about resources for teaching with it. He’d like to get other astronomy education activities to post on comPADRE as well. Bruce’s email address is: bmason@ou.edu.

One of the attendees suggested that an IPS board member or committee member should sign up for the PAM listserv. Ruth Kneale could put an IPS representative in touch with the correct contact person.

A Library and Information Services in Astronomy (LISA) conference will be held in February 2010. See www.ncra.tifr.res.in/~library/forsaweb/lisavi.htm.

Thank you, Karrie, for a job well done, both in reporting to the Special Libraries Association about IPS and in reporting back to IPS with such detail. Bruce’s email address is: hmason@ou.edu.

One of the attendees suggested that an IPS board member or committee member should sign up for the PAM listserv. Ruth Kneale could put an IPS representative in touch with the correct contact person.

Thanks for the Memories
As the sun set on another fine IPS conference, we were all very sad to leave Chicago and our friends new and old. We could not express enough gratitude for the amount of time and energy that the Adler Planetarium staff and the Local Conference Planning Committee dedicated over the last four years. Their efforts came beautifully to fruition; an extremely high quality experience for IPS members was delivered.

This year’s conference attracted the largest number of delegates in IPS history and provided a unique opportunity for participants not only to “Explore the Edge,” but also to become fully engaged and broaden their horizons through excellent speakers, sessions and papers!

We left this conference with concrete plans and steps that we can implement so that our communities, now and in the future, view planetariums as the vital institutions we know they are.

Thank you to all those individuals on the local planning committee who were involved in making this conference possible, but especially to the Adler folks: Paul Knappenberger, Larry Ciupik, Mark Webb, Beth Azuma, Julie Bishop, Karen Donnelly, Michelle Nichols and the rest of the dedicated staff at the Adler. You have provided a remarkable professional development opportunity and a great “party” (similar to a family reunion!) for your colleagues.

Don’t forget to check the conference website again for a list of the participants and to both takeandseetheresultsoftheinnovationsurvey; go to ips2008.org.

A beautiful sunset over the Chicago skyline with the Adler Planetarium sundial in the foreground. Photo contributed by Denis James
Past President’s Message

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martin@qvmag.tas.gov.au

As I write this, only a few weeks have gone by since the biggest IPS conference to date. Chicago always promised to be a wonderful conference, and the team at the Adler Planetarium did not disappoint. I am sure that everyone would agree, too, that the Hyatt Regency McCormick was an excellent venue.

At each IPS Conference, there are several things that, to me, really stand out as being highlights. This time, once again, there were many, including some wonderful sessions under the domes. If I were to single out a conference session, however, it would be the group discussions on the continued viability of planetariums around the world. That session was preceded on an earlier day by a panel session, and the grand finale saw a considerable number of IPS members breaking into groups to discuss specific questions and make lists of important points.

The Human Connection

One point agreed to by all—and justifiably so, in my opinion—is that whatever projection method is used, planetariums differ from movie theatres and similar venues in an important respect: the human interaction with the planetarian running the show. Here in Tasmania, I am finding more and more that our audiences derive a lot of their pleasure during their planetarium visit from the live component of the show—in our case and many others, a “current night sky” presentation—and from the planetarian mixing with the audience after the show to answer a few questions. Because we all specialise in our wonderful subject, this is something we should all do and continue to do.

Indeed, I would go further than that. A point raised in my own group was that each planetarium must uphold its standards and satisfy the expectations of the visiting public (and those who call or email) that the planetarium will always be an environment in which people have access to correct and accurate information.

Another important aspect of that, of course, not specifically mentioned at the session, is that if we genuinely don’t know that answer to a question, there is nothing wrong with admitting so, taking the enquirer’s name and contact details, and promising that some information will be sent. It may well be that we can’t give an immediate reply to questions about someone’s great grandfather seeing a comet sometime in the 1930s, but the important thing is that we know how to find the information and convey it later in an understandable way to the enquirer. This type of procedure increases our credibility, as nobody can be expected to answer every question on the spot.

There were some pertinent comments about our audiences. It was pointed out that audiences in general really do come for some education, having a natural desire to learn more about astronomy. We do, however, as planetarians, need to have knowledge of how our audiences learn, especially in an immersive environment.

The question of how our audiences learn, too, is very relevant today with an increasing number of planetariums using fulldome digital systems. It was pointed out that this allows us, more than ever before, to explain concepts such as eclipses and the motions of the planets. Specifically, one group stated: “Fulldome systems allow us to change our perspective, and so we should capitalise on this ability. There may be advantages that we have not yet explored, including correcting misconceptions, and there are huge leaps that are possible. This is a new type of presentation which is exciting, but we must be careful not to introduce any new misconceptions.”

These are very true words, and in my view, the opportunities for such fulldome systems to correct misconceptions is something on which we should really capitalise.

Another related comment was that we can introduce shows that address other science issues, and this should be borne in mind by people producing fulldome content; we can show all of the sciences, and can concentrate on our planet Earth to achieve this.

On a rather different note, it was agreed in my group that public talks, including those outside the planetarium dome, are important. These serve to increase our exposure, and demonstrate versatility in our programme of communicating astronomy. Indeed, at the 2007 Communicating Astronomy to the Public conference in Athens, Greece, well-known Australian astrophotographer David Malin, himself an excellent speaker, spoke on the topic of “The Importance of the Public Talk.” It went down very well and was, to me, one of the highlights of that conference.

A very important general comment was that we must be careful not to only what we “want” to do; rather, we should do what we need to do to stay viable. In other words, think of ourselves as being members of the audience; what would we want out of our planetarium visit?

You will all be aware that the IPS Council met for two days before the start of the conference, and many things were discussed. You will see all this in the minutes published in the Planetarian, and so I don’t need to go into too many details here.

Standing Rules Changes

I would, however, like to point out that a good deal of discussion took place about the rules regarding affiliate status, with particular regard to affiliates which fall short of the requirements. I proposed some changes to the Standing Rules, and the result of this is that affiliates failing to meet membership requirements will eventually lose their affiliate status. This was not intended by me as a punitive measure; it was more to encourage the affiliates to make sure that they continue to be as actively involved in the IPS as possible. I also proposed that it be made a specific requirement for an affiliate to submit a report to the Council each year. This, too, is something that has now been incorporated into the Standing Rules, and will not only keep strong ties with the IPS but also strengthen communication within the membership of each individual affiliate.

I am also very well aware that in some parts of the world, there are regions with very few planetariums, or which have not yet formed an affiliate. The rules now specifically mention this possibility, and formally point out that an IPS member may represent a particular country or region and be an observer at a Council meeting. Of course, observers are welcome anyway, but this provides a degree of
Another big highlight of the Conference was the awards lunch. I was delighted and honoured to be presented with a President’s Award, and especially so given the very large number of IPS members present in Chicago. To me, however, a far bigger highlight was the presentation of an IPS Service Award to Shawn Laatsch, our treasurer and membership chairman for the past 11 years. (See story on page 40.) For me, it was a great personal honour to speak about Shawn’s wonderful IPS work at this presentation. The Service Award is the highest honour bestowed by the IPS, and it is very, very well deserved. Congratulations to Shawn for this great achievement!

Visiting Serbia

On to other things. For a while now, Serbia has not been a place that many people would think of visiting, mainly because of the conflict in the Balkans that saw that part of Europe at war several years ago. However, as I was walking during May through the streets of Belgrade, it was hard to imagine NATO planes overhead, targeting military installations in the city.

I was there, of course, for astronomical reasons. I was on a six-day stay in Serbia during which I visited Serbia’s two planetariums and studied astronomical education in the country. The topic is alive and well, and this is largely thanks to the wonderful enthusiasm of the staff at the planetariums and observatories.

The Belgrade Observatory, on the hill known as “Zvezdara” above the city, was established in 1932 and includes a 65-cm Zeiss refractor. Most of the serious practical research, however, will soon be done at a new installation well away from the lights and pollution of Belgrade in the south of the country. I was delighted to meet up, at the observatory, with Dr. Slobodan Ninkovic and Dr. Zorica Cvetkovic. Slobodan showed me around the grounds, and was most eloquent in his description of the place and its history.

The University of Belgrade is of major importance in astronomy education. I had an interesting meeting there with Prof. Neda Bokan, the vice-rector of the university, during which we discussed astronomy and science education in general, including the IPS and its significance. She explained much of the history and current status of astronomy there, where the subject is taught within the faculty of mathematics.

Following this, I met with Prof. Miodrag Mateljevic, dean of the faculty of mathematics, and Sanja Kosanovic, the public relations director. Our main topic of discussion was IYA 2009, and it is clear that they are making plans so that the IYA will be widely popularised there.

On one day I made a visit with Sonja Vidoevic to the Petnica Science Centre near Valjevo, about two hours by road to the west of Belgrade. This is an educational establishment in a country atmosphere, where students visit (and stay overnight) to study a broad range of scientific topics. The director, Viktor Majic, and the head of astronomy, Nikola Bozic, gave up part of their day to show me around this recognition that was not present in the rules beforehand.

Another big highlight of the Conference was the awards lunch. I was delighted and honoured to be presented with a President’s Award, and especially so given the very large number of IPS members present in Chicago. To me, however, a far bigger highlight was the presentation of an IPS Service Award to Shawn Laatsch, our treasurer and membership chairman for the past 11 years. (See story on page 40.) For me, it was a great personal honour to speak about Shawn’s wonderful IPS work at this presentation. The Service Award is the highest honour bestowed by the IPS, and it is very, very well deserved. Congratulations to Shawn for this great achievement!
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interesting establishment, which includes laboratories, an excellent library, and an observatory.
I have been invited to give some lectures, using a video internet connection, to groups of astronomy students there, and am looking forward to that very much!
A highlight for me, of course, was to visit the two planetariums of Serbia, which are both in interesting locations. Belgrade's is built inside a former Turkish bath building. It is run by the astronomical society called Rudjer Boskovic, which was formed in 1934 and is named after an 18th century astronomer-mathematician. The society produces an astronomical magazine called Vasiona, which is Serbian for universe. It has been published since 1953; before that, there was a magazine called Saturn.
The society consists mostly of amateurs, but there are several professionals involved as well, which is great to see. The planetarium is efficiently directed by IPS member Natasa Stantic, an impressive communicator of the subject who has her own television programme and who, together with Sonja Vidovejic, greatly assisted me before and during my visit to Serbia. Natasa is also the Single Point of Contact for IYA 2009 in Serbia. Unfortunately, the humidity inside the planetarium is high, and the Zeiss ZKP1 projector has suffered somewhat as a result.
I was delighted to meet up with many of the other members of Rudjer Boskovic, including Alexander Otosevic, Sonja Vidovejic, Prof. Mayda Miler, Prof. Jelena Milogradov-Turin, Srdjan Djukic, Olga Atanackovic-Vukmanovic and Milan Vuletic, as well as several others to whom I must apologise for not obtaining their names!
Public astronomy is done atop one of the towers of the Kalemegdan, the old fortress that overlooks the city of Belgrade, where there is a telescope installed. The offices of Rudjer Boskovic are in the same tower. What a fascinating place to work!
In Novi Sad, an hour's drive to the north of Belgrade, my first stop was at the offices of Spremo, a publisher that produces Astronomija, an impressive, glossy, popular astronomical magazine for Serbia. There, I met up with Sasha Zorkic, the editor of the magazine, and Mirjana Spremo. It was also there that I joined the others for my first look at the pictures of the Martian surface from Phoenix!
Later I visited the University of Novi Sad, and spoke with the astronomy staff there, including Associate Astronomy Professor Tijana Prodanovic. After a delightful lunch, and presenting two talks, I was taken to the planetarium.
The planetarium at Novi Sad is built inside the structure of the 13th-century Petrovaradin Fortress. Visitors enter via a dark tunnel with glow-in-the-dark astronomical images lining the walls. Once again, the environmental conditions inside leave a lot to be desired, but this is more than made up for by the enthusiasm of staff members such as Dusan Mrjda, the planetarium's director, and Jaroslav Francisky.
As a final treat in Novi Sad, I was shown the nearby observatory. Despite the lack of financial support, they have an impressive range of instruments, including a fine Meade telescope for public viewing.
I was delighted to present several talks while in Serbia, concentrating on the IPS and Australian astronomy. These were held in the Kalemegdan in Belgrade, Belgrade University, and, as mentioned above, the University of Novi Sad. In addition, I gave several media interviews (including one live morning television interview), commenting especially on my impressions of my visit to Serbia. All of these engagements were most enjoyable.
I look forward to returning to Serbia one day!

The Belgrade Planetarium, housed inside a former Turkish bath building. The Kalemegdan is in the background.

The entrance to the Planetarium in Novi Sad.

The interior of the Belgrade Planetarium.

The entrance to the Planetarium in Novi Sad.

The planetarium in Novi Sad, with Jaroslav Francisky at the entrance (left) and with the ZKP1 projector.

The planetarium in Novi Sad, with Jaroslav Francisky at the entrance (left) and with the ZKP1 projector.
Producer Kenji Williams opened the IPS Conference. Photographic credit: Tim Horn.

Fulldome Summit
IPS 2008 was followed by the Fulldome Summit on July 3, featuring a full day exclusively focused on digital domes. The first Fulldome Summit was held in Valencia, Spain as a special session of IPS 2004.

This year’s summit was co-organized by the Adler Planetarium, the IPS, and DomeFest. I (representing Spherical Media) was a co-chair, along with Dan Neafus of the Denver (Colorado) Museum of Nature & Science and Ryan Wyatt of San Francisco’s California Academy of Sciences (and chair of the IPS Fulldome Committee).

The 2008 Summit featured 14 papers centered on the topic of the future of fulldome and emerging fulldome technologies.

Mark Petersen of Loch Ness Productions kicked things off with a “State of the Dome Address” reviewing the nearly 450 theaters listed in the Loch Ness Fulldome Compendium. According to Mark, there are actually closer to 600 systems when counting all of the portable planetariums, many of which are not in the Compendium. Nearly 75% of these 600 systems are single-projector fisheye or mirror-based systems. As Mark said, “the little guys are the biggies, market-share wise.”

This was followed by Mike Bruno of Spitz with an overview of fulldome production including typical show production budgets and show license fees (See his full paper on page 6). Mike provided tips for funding shows, ranging from federal funding sources (including the National Science Foundation, NASA, and National Institutes of Health) to private foundations, private equity, and state and local sources (including film grants and tax credits).

Typical numbers for high-end fulldome show production budgets in the U.S. range from $15,000 to $25,000 per finished minute. Distributor fees range from 20-30% and typically include promotion, negotiation, show installation and fee collection. Show licensing rates range from $2,000-5,000 for portable planetariums to $25,000 and up (or gate-share fee) for blockbuster shows in large domes.

The summit also featured a panel on “The Future of Fulldome” chaired by Ryan Wyatt. Donna Cox of the U.S. National Center for Supercomputing Applications’ Advanced Visualization Laboratory opened the panel with a review of their supercomputer simulations, many of which have been adapted for the digital dome in addition to IMAX and HDTV documentaries.

Naohisa Ohta of the Keio University Graduate School of Media Design (Shonan Fujisawa Campus, Japan) and Keio’s Research Institute for Digital Media and Content discussed his projects in collaboration with CineGrid (www.cinegrid.org), which empowers developmental projects using ultra-wideband fiber optic connections. One project presented was an opera in Amsterdam shot in 4k digital cinema that was beamed live to the University of California at San Diego’s CalIT2 lam. CineGrid now has a committee focused on interconnecting fulldome theaters.

Alejandro Diaz of Secret Level (a Sega Studio) presented his vision for video games in the dome, and long-time planetarian and consultant, Ian McLennan, discussed his forward-looking Microscopic and Sub-Atomic Visualization project in cooperation with CERN (the European Organization for Nuclear Research) that will extend fulldome content into the microcosm.

Other papers included real-time fulldome authoring systems, music video programming, live-action camera developments, cognitive science and more.
Walt Ordway releases the DCI Specification Version 1.0 in July, 2005. Photo provided by Walt Ordway

**Fulldome Standards**

The Fulldome Summit concluded with a keynote speech by Walt Ordway, the former chief technical officer of the Digital Cinema Initiative (DCI). The DCI consortium was founded in 2002 by seven major Hollywood studios to develop the digital cinema specification now used in over 5,000 theaters worldwide.

Walt related George Lucas’ experience of releasing *Star Wars Episode II* into 150 digital cinema theaters worldwide in 2002. The film’s post-production team had to create numerous unique digital masters just to show the film on the existing 85 U.S. screens. At the same time, a single 35-mm film print could be shown on over 120,000 film screens globally without any reformatting.

With digital cinema about to explode, the Hollywood studios realized that standardization would be necessary, so they each kicked in substantial capital to found DCI and develop not a formal standard (which is now being done by SMPTE and others), but a distribution specification that was decided free from proprietary formats. All seven studios accepted the specification in July, 2005 and digital cinema is now on a fast track to displace print film’s 115-year legacy within the decade.

Walt’s message to the full-dome profession was clear: adopt non-proprietary specifications for show distribution and it will ensure image and audio quality for programmers who demand it, and will open the doors to an explosion of growth in both programming and venues. Walt recommended that domes also take a serious look at the emerging trend of alternative programming, including live concerts, opera, and interactive programming.

Regarding 3D stereo programming, Walt said that there are currently 1,100 digital 3D cinema screens in the world, with 4,000 screens planned by fall of 2009. There are also around 15 digital 3D movies scheduled for release in 2009 alone from luminaries such as James Cameron and Steven Spielberg, and that George Lucas is considering releasing all six *Star Wars* episodes in digital 3D. According to Walt, digital 3D is here to stay, and has more recently been adopted into the DCI specification.

The fulldome standards roundtable after Walt’s talk included a lively discussion on the benefits and methods of nailing down full-dome distribution specifications, display calibration methodologies, and standard specifications and measurement techniques for fulldome displays.

**Upcoming Events**

The Navegar Foundation is hosting the first Immersive Film Festival, to be held at Centro Multimeios in Espinho, Portugal from April 24-26, 2009. The festival is open to producers, animators and filmmakers, artists, students and teachers working in the fulldome medium. In addition to the competition and public screenings, workshops for young artists and public talks will be organized to promote immersive cinema. Submissions are due by Monday, 16 February 2009. Please visit the website for further information, iff.multimeios.pt

Several fulldome-related presentations are included during this year’s Association of Science and Technology Centers (ASTC) conference at Philadelphia’s (Pennsylvania) Franklin Institute, set for October 18-21, 2008. On October 20, Alexandria Hall will present a paper titled “Addressing Culture and Science in Digital Dome Theaters/Planetariums.” Later that day, three activities in the Fels Planetarium include:

• the 5th annual “Fulldome Video Showcase” featuring a sampling of work from the world’s best digital dome artists, including scientific visualizations, show excerpts, music/art, and experimental productions (organized by E&S and Spitz);

• “Finding Your Way in the Dark II: Switching Program Paradigms in the Planetarium” with Derrick Pitts, director and chief astronomer of the Fels Planetarium; and

• “A Whole New World: Science Visualizations on the Dome” organized by Sky-Skan.

For more information go to www.astc.org/conference.

**Notes**

1 The 2004 Fulldome Summit papers are available at: extranet.spitzinc.com/reference/IPS2004/default.aspx

2 The 2008 Fulldome Summit full program with paper abstracts can be downloaded at www.ips-planetarium.org/fulldome/ips2008_summitProgram_full.pdf

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**IMERSA**

IMERSA, the Immersive Media Entertainment, Research, Science and Arts association officially launched at the 2008 Fulldome Summit. Announced by co-founder Dan Neafus, IMERSA is an “international professional association advancing the art, science, profile, integrity and common interests of large-format digital immersive media and group interactive entertainment and cultural experiences including (but not limited to) immersive digital theaters and digital dome (fulldome) planetariums.”

The organization is intended to supplement IPS by serving the unique needs of the digital dome community, especially those extending outside of traditional astronomy education.

IMERSA membership categories were announced, as was the fact that $28k USD in startup capital was raised by founding sponsors at the summit, thanks to the efforts of Membership Chair Martin Howe of Global Immersion. The IMERSA founding board includes Summit co-chairs Lantz, Neafus and Wyatt, plus David Beining, University of New Mexico ArtsLab and DomeFest founder; and David McConville, director of Nootropic Research at The Elumenati (Wisconsin and North Carolina).

According to Neafus, IMERSA will continue to build up through 2008, becoming fully operational in 2009 with a salaried administrator. The organization plans to pioneer industry standards for immersive media in addition to providing industry research, a networking website, media outreach, professional development, and program development benefiting the immersive media industry. For more information and updates, see www.IMERSA.org.
This year DomeFest departed from its usual Albuquerque (New Mexico) home to be held in Chicago alongside IPS 2008 and the Full-dome Summit. This year the festival had 29 entries from around the world. Chabot Space & Science Center (Oakland, California) again generously hosted the jury review session. A distinguished jury of eight professionals selected 13 pieces for the final program, as well as two alternates. The 2008 DomeFest jury included:

- Samuel Lord Black, senior software engineer, Autodesk (jury chair)
- Alejandro Diaz, gamer developer, Secret Level (a Sega studio)
- Ben Shedd, filmmaker, Shedd Productions
- Greg Ward, president/lackey, Anyhre Software
- Kevin Cain, director, Institute for the Study and Integration of Graphical Heritage Techniques (INSIGHT)
- Lubov Jayko, environmental artist
- Mark VandeWettering, technical director, Pixar Animation Studios
- Ryan Wyatt, director of Morrison Planetarium and Science Visualization, California Academy of Sciences

The DomeFest Domie awards provide special recognition of selected fulldome pieces in the DomeFest Juried Art Show. This year's winners appear to the right.

DomeFest also featured “The Making Of...,” sessions that combine a screening with producer presentation and question and answer session, and a late evening demonstration of dome video game by Alejandro Diaz. An unscheduled bonus, DomeFest attendees also were treated to the Chicago July 3 fireworks show from the ideal vantage point of the Adler Planetarium.

Matt Mascheri received DomeFest’s Harmony Channel Award (courtesy Harmony Channel).
volvement with planetariums;
• To maintain a presence on the IPS website and in the Planetarian;
• To sponsor regular paper sessions and workshops at IPS and affiliate conferences, as well as at other educational conferences; and
• To network with the Outreach Committee for the purpose of enhancing collaboration between industry and academia and between the IPS and related educational organizations, and to facilitate distribution of educational materials to members.

Now that we’re familiar again with the Education Committee’s mission statement, let’s meet Jack. Below is an interview that I recently conducted with him in which he reveals some exciting projects that he and his committee members are currently working on. (Note: I have since joined the committee.)

Steve: Well, Jack, congratulations on your appointment. Could you begin by telling us what your personal aims and objectives are for the committee?
Jack: I have based my aims for the Education Committee on the objectives listed on the IPS website. Objective 1 is to provide age appropriate techniques and educational standards for programming and curriculum. To reach this goal the committee is gathering astronomy content standards from around the world, and we will be taking that information to make a graphical organizer to assist planetarians in aligning their presentations.

In response to our third objective, we are producing a database of contacts that can be used in a mentoring program for new planetarians. I am currently in touch with several schools and businesses that use mentoring programs for new employees, to see how these programs will translate over to the planetarium community.

With the upcoming International Year of Astronomy, the remaining objectives are going to come into play. We can work with facilities to help ensure that the materials are age appropriate and engaging. I also see our webpage developing as a source for members to develop hands-and minds-on activities that can be used to fill out an IYA experience.

Steve: Could you introduce the committee members for us?
Jack: Our committee is still developing, and interested parties are more than welcome to email me and we will open a conversation. From our meeting at the Chicago IPS conference, we are showing a tendency for a truly international committee and diverse core audience that I would like to see continue. We have people from museums and the private sector, and from elementary through college. We will be able to present educational content and pedagogy to other planetariums in a wide variety of situations.

Steve: What projects are occupying the committee’s time at the moment?
Jack: We are working on four projects right now.

1. The use of word walls (a method to teach language concepts) to develop a universal language of terms used in astronomy education, such as, at what age is it appropriate to transition from using “orbit” to “revolution?”
2. We are also starting “Astronomy in Your Neighborhood,” in which we are identifying people in our areas who have made contributions to astronomy. For example, my area has Clay Anderson, an American astronaut, who traveled to the International Space Station in 2007 and worked to prepare the station for the arrival of the Harmony module. I see this becoming a source of information that can be used to promote to learners the varied and diverse contributions to astronomy.

3. Where does technology fit in our educational scheme? Astronomy is, at times, a very abstract topic area, and students may need some form of scaffolding to assist them in succeeding. As many of our younger learners are well trained in the technologies of Web 2.0, which uses the internet as a creative and social tool, it would be advantageous for planetariums to offer experiences using these tools.

A couple of the ideas that we have presented include:
a. Promote the creation of a Skype- or iChat-based pen pal system for planetarium-sponsored interactions across time zones.

b. The use of blogs (secured to be in compliance with the Child Protection Act) to facilitate astronomy content discussions, and co-authoring of astronomy-related creative content.

If you are interested in participating in either of these projects, please email me. My students and I have been doing activities like this for several years.

4. Gather standards and curriculum that are used in astronomy from kindergarten through to the end of high school around the world. We are also developing ties to college education, to ensure that we are presenting to the members current educational strategies.

**Steve:** What do you see as the key principles in effective astronomy education?

**Jack:** My committee members heard me say in Chicago that we need to hook students on astronomy early. A strength for planetariums is that we can get people interested in astronomy young and foster that interest through college. I think that truly successful astronomy education has to be age appropriate (quantum mechanics will go over the heads of most first graders), engaging to the learner, scaled to provide support or expansion based on learner’s needs, and present astronomy as a topic that is created from a mosaic of multicultural influences, inventions, and innovations.

I feel strongly about the last as being one of the major reasons I entered a career in astronomy. Growing up in the era that began with Explorer 1; instead it was a short biographical planetarium show on James A. Van Allen; it was not focused on the Van Allen belts or Explorer I; instead it was a short biographical planetarium show. It presented to me a window to see through my own preconceptions about careers in astronomy. Since then I have retained my interest in astronomy, and now have expanded into astrophotography, archeoastronomy and astronomy education.

**Steve:** Of what help could the general membership be in aiding the Education Committee to be particularly useful and productive?

**Jack:** When we are ready to start filling our mentoring database, we will be asking each region to send us names of interested parties. Also, we could use some help with the Astronomy in Your Neighborhood project. The members of the Education Committee are spread out across the world, and we do not cover every topic.

For IYA, we are seeking activities that you are using. They can be based on papers or posters that you have presented. Examples of short activities that can be used in conjunction with larger IYA experiences include “Constellation Darts,” a lesson modified by Liz Klimke from New Mexico State University; or Remote Controlled Mars Rovers, based on an IPS Conference poster presentation by Mary Hiller from the Newark (New York) Museum’s Dreyfuss Planetarium. If you have an idea that needs field testing or fleshing out, please email me and I can add it to the Education Committee Workspace Yahoo group for IPS members’ input.

**Steve:** The rapid growth of fulldome technology is transforming the planetarium profession. What are the specific benefits you see accruing to us in the form of new educational opportunities, and are there any points of concern for you with full dome from an educational perspective?

**Jack:** Fulldome technology has arrived on the scene, and for some of us that means a change in pedagogy in the classroom. However, we must think about what is driving the lesson: the tool or the content? If the audience is shown a high-resolution sky with alt-az, celestial, and galactic grids, but the purpose of these elements are not explained, they are just pretty colored lines.

It would not be productive for us to create a show just on the alt-az grid system, but if you can use your fulldome technology to make a five-minute vignette to establish the audience’s comfort with the topic, then it can be introduced without apprehension. Fulldome can be a powerful educational tool for the presentation of content.

**Steve:** What’s your take on the education vs. entertainment balance within a planetarium show?

**Jack:** I see entertainment as part of the puzzle of a planetarium. I know from writing my own shows and presentations that I cannot show the same thing to fifth graders that I use with eighth graders. What catches and holds their interests are different, so I think it is important to know your audience’s preferred balance of education and entertainment. But for me, I have to remember that with each presentation I have specific educational goals to meet, and that I need to be more concerned with engaging the learner than entertaining them.

**Steve:** What do you think you bring to the role of education chair that will serve the IPS membership particularly well?

**Jack:** I am very fortunate to be the director of a planetarium associated with a science magnet school. We have 800 students from urban to rural backgrounds in grades five through eight in-house, and we also work with students from across the Omaha metropolitan area like a science center. I endeavor to make myself a perpetual learner. I tell my students that I believe in the productive use of summer vacation: go to a workshop, take a class, read two non-fiction books that catch your interest, or shadow a person whose career you have wondered about.

★★★

So it’s clear from Jack’s encouraging remarks that the Education Committee is in good hands. It is dealing with projects that need and deserve your support, so I encourage you to consider giving Jack your input. We only get out of the IPS what we put into it, and here is a great example of how the membership can pool its deep knowledge and resources to help everybody.

IYA 2009 will clearly be a huge event for planetarians all over the world, and so I would like to see it galvanise many IPS members to use as much of the Education Committee’s resources as possible. The committee is one of the most important that our organisation has to offer, so please put it at the heart of your IYA initiatives and think about how you can contribute your own skills to making its output even better.

I have recently returned from an extended trip to Ecuador. It was marvelous to see both hemispheres rotating above at night, and I was fortunate enough to pay a visit to the equator line just outside of the large city of Quito. There’s a lovely (and cheap) tourist village named Mitad del Mundo (The Centre of the World) a few miles north of Quito that’s been built around the central monument that was built in 1979 to mark the equator. On site there’s also a lovely planetarium that seats about 60. It has a small Zeiss star projector that, on the evidence I saw, gets a thorough workout in every show as the program’s producers had decided to keep the diurnal motion on for about 70% of the 35-minute show! Still, even though the recorded narration was in Spanish, a language I’ve only recently started to learn, it was a great show that was refreshingly old-fashioned.

This highlighted for me how astronomy can be fitted into a tourist destination in a skillful way, and what a pleasant surprise it must be for many of the visitors to that site to have an opportunity to see a good, relevant planetarium show. Education is truly everywhere, and the more we can make it relevant to people and their personal experiences the better we serve them, ourselves and our profession. ☆
CHIRON – son of CHRONOS

According to Greek mythology, CHIRON was a Centaur – half man and half horse – a true hybrid! CHIRON was the son of CHRONOS, and is legendary for his wisdom, his ability to teach, and in the end – his immortality in the shape of the southern constellation Sagittarius. GOTO INC is now proud to announce that we have now named our newest projector, the CHIRON HYBRID Planetarium™!

CHIRON truly is the son of CHRONOS, the landmark planetarium projector created from user input, and which revolutionized the industry over the past 5 years. It shares the exact same control console and system as the CHRONOS HYBRID, including all of the ergonomically designed features allowing ultimate ease of use.

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This CHIRON will teach the sky better than any planetarium projection system ever made. Featuring from 15,000 to more than 1,000,000 stars - at the owner’s request - it can reproduce the night sky with exquisite subtlety and fidelity - far better than any video-only system on earth.

And will this CHIRON be immortal and live forever? Well... no. But it will serve several decades, far outliving even the most optimistic lifetimes of today’s video-only systems.

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Contact: Ken Miller
Reflecting on this encounter later, I recognized that I had been acting as a planetarian, even though I was outside of the dome. Sharing the excitement of the onlookers rekindled my enthusiasm for planetarium work. I realized that I didn’t just wield a pointer, but also served as one myself—alerting the public to something in the night sky, pointing it out, explaining something about it, and fostering understanding and appreciation. We all serve as pointers both inside and outside our respective domes.

Suspecting that others may have had similar encounters they might like to share, I posed the following question:

**What do you recall as one of your most moving or poignant encounters under or outside of the dome—one that rekindled your initial enthusiasm for planetarium work? How did you feel then and how do you feel now recalling it?**

My question sparked only two responses, but they glow quite brightly. I believe we can identify with each of the responses, not so much in the particulars as in the feelings they evoke. My thanks to both respondents for their willingness to share their experiences.

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Since I work for a K-12 school district, I often approach things from the mindset of being a teacher employing the basic elements of instruction, reinforcing concepts, and then checking for retention. Most of the time this works very well with the groups I see. However, I had a day where I found myself momentarily dumbfounded before my audience and wondered what I should do.

Like many of us, I work with all ages and abilities. I didn’t think much about the fact that I had a reservation from a retirement community or adult care home. I had worked with similar groups over a 10-year period of time. However, just as the group was entering the building, I learned that the trip to the planetarium was an outing for the Alzheimer’s patients and a few spouses who were accompanying the group.

Here I was, just two minutes away from “welcoming” my group to the planetarium, and I didn’t have a clue on how to approach things. My paradigm of being a teacher and trying to help people learn things about the night sky just didn’t fit. What was I going to do?

I eventually wandered to the front of the theater with some apprehension, and then it dawned on me just seconds before I opened my mouth to greet everyone. The thoughts quickly crystallized out like a revelation in my brain: “Don’t teach! Focus on providing**

---

My interest in the sky above has always been there. Certainly the national enthusiasm for the space program during the 1960s was my main spark, although my defining point was from my high school teacher and planetarian, Roger Grossenbacher. He encouraged me to get involved in the high school planetarium and sky watching. He supported and facilitated an internship while I was in college that allowed me to learn the nuances of the sky.

When I was in graduate school at Michigan State University, Dave Batch and Bob Victor encouraged the communication skills and sky watching skills that carried into the dome. Working with both of them helped me further develop my understanding of standing under the domed sky with a group of students and expressing my fascination with the sky while telling starry tales.

The influence of these individuals is reflected each time I work with students to share and they amplify their excitement with the sky. Their “thank you” letters show that we profoundly influence students. While I’m not
VACATION ON ALTAIR
tries have some mechanism for copyright protection. While virtually all developed countries have been waiting patiently for years for the Office to finally jump on the online bandwagon, I thought it might be an ideal time to discuss some basics of copyright registration, and, supposedly, more efficient for the Copyright Office and less expensive for copyright owners, promises to make the registration process easier and less expensive for copyright owners, and, supposedly, more efficient for the Copyright Office. Indeed, recent reports suggest that it takes about eight months to process a registration claim; the Office claims the new eCO initiative will help reduce the backlog.

On July 1, 2008 the U.S. Copyright Office began accepting applications for copyright registration through its new online registration portal. Dubbed “eCO” for “electronic Copyright Office,” the new online system has been in beta testing for a number of months, and promises to make the registration process easier and less expensive for copyright owners, and, supposedly, more efficient for the Copyright Office. Indeed, recent reports suggest that it takes about eight months to process a registration claim; the Office claims the new eCO initiative will help reduce the backlog.

Given this relatively revolutionary shift in copyright registration practice (copyright lawyers have been waiting patiently for years for the Office to finally jump on the online bandwagon), I thought it might be an ideal time to discuss some basics of copyright registration, what it means, how it works, and how to register your own works.

But first, as usual, a quick note about jurisdiction: While virtually all developed countries have some mechanism for copyright protection and enforcement, many do not have a copyright registration scheme. The United Kingdom, for example, has no formal, government-sponsored registration process. In the United States, the process is provided for by the Copyright Act and is managed by the Copyright Office, which is a unit of the Library of Congress. This column focuses principally on the law and registration practice of the United States.

Also important to understand at the outset is that while registration provides certain benefits, it is not a prerequisite for copyright protection. Copyright protection subsists from the moment a copyrightable work is fixed in a tangible medium of expression. Put differently, to obtain copyright protection, a creator need only create a copyrightable work. Registration is, thus, a “good idea,” but not essential.

**Benefits of Registration**

What, then, does registration do for the copyright owner? For one, registration provides public notice of a copyright owner’s claim. Because the Office’s public database is searchable online (www.copyright.gov/records), registration puts would-be users of copyrighted works on notice of the copyright claim, and provides contact information for the copyright owner or administrator. The public notice makes it more difficult for an infringer to argue later that he or she was unaware that the infringed work was protected by copyright.

Moreover, the copyright registration certificate serves as evidence that the work is validly copyrightable, eliminating the need to prove that point at an infringement trial and when attempting to obtain a preliminary injunction to prevent impending or ongoing infringement.

But perhaps the most important feature of a registered copyright is that it entitles the copyright owner to bring suit for infringement. While copyright protection originates from the mere creation of a work, the right to sue for infringement comes from registration. For purposes of enabling suit, it does not matter when a copyright owner seeks registration, so long as it comes before the lawsuit is filed.

**Timing Considerations**

If the copyright in an infringed work was registered either (1) prior to the infringement; or (2) within three months of publication, the court may award the copyright owner up to $150,000 per infringement, regardless of the actual damages or lost profits sustained by the copyright owner (damages may also be as low as $200 depending on circumstances; see my March 2008 column on copyright damages for more). The copyright owner may also collect attorney’s fees. If the work is unregistered, the owner may sue only for actual damages or lost profits, the magnitude of which may be difficult to establish.

Because the either/or nature of the registration requirement can be confusing, here are a couple examples to illustrate the timing principles:

Example 1: Roger writes a planetarium show script and registers the copyright before submitting the script to IPS Eugenides Script Writing Competition (assume entry into the competition is deemed a “publication” for our purposes). The script is unfortunately intercepted by an unscrupulous delivery service employee who scans it and posts it on his web site, though he never generates any revenue from the script. Upon learning about the theft, Roger brings suit against the delivery service employee for copyright infringement. At the trial, Roger admits that he had
no plans to commercialize the script and that he wrote it solely for his personal enjoyment. Roger ultimately prevails on his infringement claim, and because the work was both registered within three months of publication, and at the time of infringement, he is entitled to statutory damages and attorney's fees.

Example 2: Same facts as above, but now assume that the script was stolen one week after Roger mailed it to IPS, and that he registered the copyright two months after that. Although the copyright was not registered at the time of infringement, Roger is still entitled to statutory damages and attorney's fees because the registration came within three months of publication.

Example 3: Elaine, a composer, is hoping to make it big in the space music industry. She records a demo CD featuring several compositions that she subsequently sends to various planetariums and show producers (assume sending the CDs constitutes publication). She hears nothing. Four months later, Elaine attends the opening of a new show at her local planetarium, which is, of course, one of the facilities to which she sent a demo. To her surprise, the score was comprised entirely of her music. The next day, Elaine registers the copyright. She subsequently sues the offending planetarium, claiming infringement. Although Elaine prevails at trial, she is entitled only to actual, provable, damages because the copyright was not registered at the time of infringement, nor was it registered within three months of publication.

Example 4: Same facts as above except that Elaine registers her copyright six weeks after she sends copies to the planetariums and show producers. Evidence at trial demonstrates that Elaine's music was not synchronized with the planetarium show until just a few days before its premiere. Even though the copyright was not registered at the time of infringement, because Elaine registered it within three months of publication, she is entitled to statutory damages and attorney's fees.

Example 4 raises an important point about the effective date of copyright registrations. Copyright registration is effective on the date the Copyright Office receives a complete filing, not when they get around to processing the application and issuing a registration certificate. Accordingly, when sending materials to the Office, it's always advisable to use a traceable delivery service, or certified mail with a return receipt requested. Note, though, that Postal Service deliveries to the Office are often significantly delayed due to mail security procedures in Washington, D.C., where the Office is headquartered. Of course, these issues are eliminated when one uses the new electronic registration system which allows registrants to submit everything, including the registration fee, online.

The Registration Process

The mechanics of applying for copyright registration are relatively straightforward, although there are some issues to be aware of, particularly for planetarians who may seek to register complete planetarium shows, or other materials that contain various elements contained by multiple individuals or entities. Although the electronic registration system has streamlined the process somewhat, the system is still in its infancy and, accordingly, limitations remain. Fortunately, the traditional registration process, using paper forms remains an option for those who prefer the hardcopy route. I will discuss the nuts and bolts of the registration process in the December 2008 issue. Until then . . .
NARRATED BY LIAM NEESON

MUSIC BY RICHARD FIOCCA

THE OTHER SIDE OF INFINITY
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BLACK HOLES: THE OTHER SIDE OF INFINITY is a Denver Museum of Nature & Science Production, supported by grants from NASA’s Exhibition Based Education & Outreach program and the National Science Foundation. It is directed by Thomas Clark and coproduced with the National Center for Supercomputing Applications. Science advisors include Dr. Andrew Hamilton (University of Colorado) and Dr. Lynn Cominsky (Stanford University). Narration by Liam Neeson. Approximate 70 minutes. Images © Denver Museum of Nature & Science.
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The International News column in *Planetarian* 2/2008 was an all-time high with contributions from 20 Affiliate Associations. It was the 50th jubilee column, and Donna Pierce noted that the jubilee was presented on page 50—very suitable!—but Planetariums Association of Dutch-Speaking Planetarians, Alan Dyer, John Hare, André Milis, Donna Pierce, and Loris Ramponi for your contributions, Didier Mathieu conducts projects on mineralogy (including the discovery of a meteorite), biology, chemistry, physics, mathematics, and organisation of an “astronomical garden.”

The deputy-mayor of Epinal and Pierre Lena, a member of the prestigious Académie des Sciences, presented superb speeches for the opening celebration, where the RSA Offer was attributed to Aldo Cabanis.

The APLF/European Southern Observatory show created for the International Year of Astronomy 2009, *The Quest of Our Cosmic Origins*, is a European planetarium show produced in cooperation with Mirage3D. It was presented during IPS’08 in Chicago, and is available in six languages for all interested IPS planetariums (contact: aplf@astro.u-strasb.fr).

The show is focused on ALMA, the Atacama Large Millimeter/submillimeter Array, one of the largest ground-based astronomy projects of the next decade, presently under construction on a 5,000 meters high site in the Atacama Desert in Chile.

This global astronomical enterprise, in collaboration between East Asia, Europe, and North America, will start partial operations in 2010. With its 66 antennas, it will be the most sensitive submillimeter instrument ever built. ALMA will detect and study the earliest and most distant galaxies, the epoch of the first light in the universe. It will also look deep into the dust-obsured regions where stars are born to examine the details of star and planet formation. ALMA will thus be a unique machine to explore the cold universe, and the early steps of the history of both the Universe and the solar system.

(Note: The photo shown on page 52 in the June 2008 *Planetarian* 2/2008 is not the casino planetarium mentioned in the text. Apologies, LB.)
Italian Association of Planetaria

Confirming a trend established in the previous two years, in 2007 the Planetarium of Rome again ranked among the 10 most visited science museums in Italy, with a total of more than 100,000 visitors per year. This makes the planetarium a reference nationwide for communicating astronomy. About two thirds of the attendance came from schools, but an increasing interest was shown by different sectors of the public, thanks to a continuing effort towards the differentiation of formats, languages and targets of the planetarium’s cultural offerings.

The last months marked a meaningful change in the relationship between the planetarium and its public, as, for the first time in its very young history (it was opened in 2004), the planetarium offered a full calendar of special events throughout the year that was beyond the regular opening hours. The Cartellone 2007 featured “A Blow of Infinity” and included 27 different nocturnal events and involved the collaboration of more than 40 guest speakers and performers, among them scientists, astronauts, musicians and artists. The Cartellone featured a variety of formats produced by the planetarium staff: observing nights on the occasion of the most prominent astronomical phenomena; full moon gatherings, a very successful lecture series featuring the most famous Italian astronomers; “Astronomers for a Night,” where the public was invited to perform real observations from the planetarium in remote link with a virtual telescope; and two “Astrocafés.”

The planetarium produced the opening event of the VIII National Astronomy Week for the Department of Education at the new Rome Auditorium, and took part in Rome’s Darwin Day and the famous Notte Bianca, with an all-night program connecting astronomy and popular culture through celestial dances, which drew a record attendance of 8150 people.

Four new shows were produced by the planetarium staff, bringing the menu to a total of 61 different original shows. Overviews of the activities and a public evaluation study were presented at the Annual Meeting on the Communication of Science in Forli, at the meeting Communicating Astronomy with the Public held in Athens, and at the 2007 Ecsite Annual Conference in Lisbon.

Among the other projects that are planned in Italy, it is worth pointing out the ones in Saint Barthélemy, Caserta, and Padua. The first one is a 10-m dome, equipped with an ISS RBSA Cosmos 6 channels solution, in a beautiful location into the mountains of Valle d’Aosta, where there is also a well equipped astronomical observatory. The Planetarium of Caserta—a town in South Italy, close to Naples—is a 7-m dome project (with an ISS 5 channels solution) and is hosted inside a public school. Last, but not least, is the project in Padua, one of the towns where Galileo Galilei lived and worked. It will have a digital projection system, an 8.5-m dome, and will be opened in 2009, the International Year of Astronomy.

The officers of the new national organization of Italian planetariums, called Planit, the Association of Italian Planetaria, are the following: Fabio Peri, president; Walter Riva, treasurer; Loris Ramponi, secretary; along with Lara Albanese, Gianluca Ranzini, Vincenzo Vomero, and Alessandra Zanazzi.

The XXIV National Conference of Italian Planetaria will be held on 18-19 April 2009 in the City of Science in Naples.

Canadian Association of Science Centres

Victoria. In Victoria, B.C., the National Research Council’s Centre of the Universe interpretive centre has seen many positive changes over the last year as exploration of the process of re-branding is continued. Being on a hilltop outside of the city, the observatory does not see a lot of visitors outside of the summer. The solution was to close to the public during the months November to May. This gave the chance to meet their mandate and concentrate on developing and delivering school programs. All feedback from teachers has been positive. This emphasis on dedicated school programming has resulted in an appreciable increase of 40 percent for school bookings. To further this evolution, they have upgraded to a Digitalis planetarium projector. Presently, programming capabilities are in their infancy but they are looking forward to make strong contributions to the planetarium community in the near future.

The Dominion Astrophysical Observatory’s application to become a historic site is currently under review and an answer is anticipated in early October, just ahead of IYA 2009. Along with this designation, a site beautification is being planned that will be a welcome sight for our guests. Contact: Steve Ewald, Steve.Ewald@nrc-cnrc.gc.ca.

Edmondton. The TELUS World of Science in Edmonton has recently purchased the SkySkan Digital Sky II projection system for the Margaret Zeidler Star Theatre, a system originally bought in for fulldome demonstrations. This system has completely replaced the old slide-based projection system, Zeiss projector, and laser projection system, and has allowed for new and exciting content to be shown in this 23-m theater. Fulldome shows currently running include The Secret of the Cardboard Rocket (from the Clark Planetarium), Molecularium (from the Rensselear Nanotechnology Institute), The Planets (from the National Space Centre) and Dawn of the Space Age (from Mirage3D). In addition, they are offering a presentation called What’s Up in Astronomy?, a live program that showcases the current night sky, the latest space and astronomy news, and a look at the scale of the universe using the Digital Universe plug-in.

On the exhibit side, the Space Gallery had to be removed to make room for the Body Worlds exhibit, which will be on site until 13 October. Some of the Space Gallery exhibits will be updated during the run of Body Worlds and put back into place in November to be ready for the International Year of As-

GLPA News: Dean Regas with the Merz und Mahler 11-in (28-cm) refractor (1845) at the Cincinnati Observatory in Ohio. See the Ohio section for more. Photo by Dale Smith
trononomy, which will become a big focus of TELUS’ programming in 2009. Contact: Frank Florian, FFlorian@telusworldofscienceedmonton.com.

Calgary. At the TELUS World of Science in Calgary, work is well underway on the production of a live-actor-based show, Galileo Live!, to open in 2009 at four planetariums across Canada: Vancouver, Calgary, Winnipeg, and Montreal. In June, the consortium, which has produced two previous cross-Canada shows, was awarded full funding ($170,000) from three federal agencies: the Canadian Space Agency, the National Science and Engineering Research Council, and the Museums Assistance Program of Canada Heritage.

The show is being written for a live performer playing the role of Galileo, who tours the public through “his sky,” with the focus on sights the audience can experience in their own “Galileo moments.” It is neither a history of the telescope nor a biography of Galileo. Instead, authors trust it will be an inspiration to audiences to explore a universe “that is theirs to discover,” following the motto of the International Year of Astronomy. Calgary will serve as the lead production facility, with production work distributed across Canada. This program will serve as the anchor product for IYA programs in these cities. Contact: Alan Dyer, alan.dyer@calgaryscience.ca.

Winnipeg. In Winnipeg, the planetarium at the Manitoba Museum is producing a new school show on the solar system to accompany their successful hands-on workshop. Designed for the Canadian grade 6 curriculum, the show will cover some of the basics of the solar system but focus on future exploration by human and robotic explorers. Also in the works is a revamp of their series of live shows to take advantage of a new video playback system, which will allow show presenters to easily integrate more visuals into their classic planetarium sky tours. Contact: Scott Young, scyoung@manitobamuseum.ca.

Toronto. It has been an exciting year for the Ontario Science Centre in Toronto. February saw the opening of the newly-redesigned Space Hall, featuring Mars and moon rocks and one of the only publicly-accessible cloud chambers in Canada. A generous sponsorship from Computer Associates enabled the upgrade of the Centre’s planetarium to a new dual-head Zeiss Projector and Zeiss SPACEGATE QUINTO digital projection system. Using their new Zeiss equipment, the Lakeview Museum Planetarium in Peoria presented four new shows this summer. The Museum hosted its annual Interplanetary Bicycle Ride on 21-22 June. Riders navigated through portions of Peoria’s Community Solar System model.

The William M. Staerkel Planetarium at Parkland College in Champaign hosted a very successful spring and summer 35mm film festival. The second annual “Summer Solstice Celebration” at the University of Illinois featured Dr. James Kaler adding commentary to a jazz performance and Wayne James and Dave Leake operating a STARLAB.

The Cernan Earth and Space Center at Triton College in River Grove welcomed back former Space Shuttle Astronaut Story Musgrave as their “Big Event” speaker on 22 August. This summer, the Cernan Center presented an assortment of nine different programs.

Indiana. The Indiana Spring Meeting was held at the E.C. Schouweiler Memorial Planetarium, University of Saint Francis, Fort Wayne on 26 April. Thirty-seven people attended, representing planetariums in Michigan, Ohio and Indiana. Highlights included
seven papers, two planetarium shows, and a demonstration of Ash Enterprises’ Warped Media all-dome video for small dome planetariums.

Michigan. Spring has been busy at the Roger B. Chaffee Planetarium in Grand Rapids. In mid-April, the Chaffee hosted astronaut and NASA’s Advanced Planning Office Administrator David Leestma. Leestma's public presentation discussed his three missions to space and NASA’s plans for the return to the moon and expeditions to Mars. At their recent Astronomy Day, hundreds of people flocked to the museum to see telescope displays by the local astronomy club, a gigantic display of planet scales (with a 3-m/10-ft Jupiter), plus fun crafts and children’s activities.

Astronomers at Cranbrook Institute of Science in Bloomfield Hills have been kept rather busy with a sold-out school group schedule, a sold-out lecture by “Bad Astronomer” Phil Plait, and production of new planetarium experiences to debut next school year.

At the Kingman Museum Planetarium in Battle Creek, this year’s museum attendance has increased around 60% when compared to last year. They have received funding to enhance geology programming and add hands-on exhibit activities.

Longway Planetarium in Flint celebrates its 50th anniversary this year. A number of family science programs and summer science camps were held during the summer.

The Vollbrecht Planetarium in Southfield recently enjoyed a successful season of eight, 90-minute, live Friday night public shows. A recently donated computer now provides internet capability.

Ohio. Ohio planetarians gathered for their annual spring meeting at the historic Cincinnati Observatory. Built in 1873, the observatory houses the venerable 1843 Merz und Mahler 28-cm (11-in) refractor (see photo on page 70), which may be the oldest continually-used telescope in the world. The meeting also visited the Wolff Planetarium at the Trailside Nature Center, which is the oldest operating planetarium in Ohio.

The Shafran Planetarium hosted Astronomy Day on 10 May at The Cleveland Museum of Natural History. Visitors attended sky shows, viewed Venus in the daytime, assembled make-and-take models, and ground a telescope mirror. Shafran recently presented its own sky shows that take audiences on a hunt for extrasolar planets.

At the Shaker Heights Planetarium, Gene Zajac has been going to elementary schools for two different programs that are part of the training and promotion he did for STS 218, the Teacher in Space Challenges. His first program was a presentation about teacher Barbara Morgan, the moon’s environment and the needs of plants. Gene and Joe Marencik were given another bus for their mobile space station and transferred the labs into the new bus in June and July.

The Bowling Green State University Planetarium concluded its spring program schedule with short runs of some of Dale Smith’s original productions. The BGSU calendar also offered a pair of performing arts events: a poetry reading by an English instructor and a euphonium-piano concert featuring a BGSU alum. Both events included visual scenes to accompany the readings and music.

Christa Whitworth gives Lars Broman a radio sky Starlab cylinder. Photo by Mark Labrecque, Learning Technologies

Wisconsin/Minnesota. At the WIMPS spring meeting, hosted by Dave Williams and his crew at St. Cloud State University in Minnesota, 40 attendees saw that facility’s new instrumentation and journeyed to Baxter to see Brian Wallace’s Digistar 3 SP2 facility at Forestville Middle School. Jean Creighton, at the Manfred Olson Planetarium at the University of Wisconsin-Milwaukee, reported that their dome was cleaned and painted, and that a new East Coast Control System LED lighting system, data projectors and a new sound system has been added to their theater.

The Daniel M. Soref Planetarium at the Milwaukee Public Museum recently presented its own production of CSE: Cosmic-Looking for Life in the Universe. It is currently working on a new show called Galileo that will showcase the power of today’s telescopes from the eyes of the man who started it all.

This summer, the Allen F. Blocher Planetarium at the University of Wisconsin-Stevens Point featured Gods of the Solar System, the production of their very own Amy Wilder. Amy recently graduated and is moving to a planetarium job at the University of Texas at Arlington.

While waiting for a permanent facility to be built, the Minnesota Planetarium Society has taken their dome to locations throughout the state and nation. During the past year, they have shown the universe to 22,000 students and 10,000 other people.

This summer, the planetarium at Minnesota State University-Moorhead was renovated, and Dave Weinrich was off installing stars in Ghana. A Mediglobe planetarium was installed in West Africa’s first public planetarium, built, and Dave Weinrich was off installing stars.

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Finnish Science Centre Heureka, and Timo Rahunen, Tampere Planetarium; from Norway, Jan Alfred Andersson, The Norwegian Museum of Science, Technology and Medicine; and from Sweden, Lars Broman, Teknoland, Tom Callen, Jessica Christensen and Björn Heden, Swedish Museum of Natural History/Cosmonova, and Katarina Anna Przybyl, Norrköping Visualization Center. Representing SCISS (Smart Content for Interactive Systems) and also from Sweden were Staffan Klashed, Jonas Lindqvist, Jan Warnstam, Johan Öhlund, Per Hemmingsson, Marcus Lyssé, Daniel Sundberg, Dennis Gustafsson, and Nigel Jenkins participated.

Jacobsen and Petersen were among five planetarians who were named IPS Fellows during the conference’s Awards Lunch (see page 40). During the conference, Petersen gave an oral presentation on “In-depth Evaluation of an Unprepared Field Trip,” and Broman presented a poster on “Astronomy Education Facilitated by Combining Live Digital Planetarium Shows and Interactive Exhibits.”

Christa Whitworth from Pisgah Astronomical Research Institute PARI, North Carolina, USA has developed a radio sky cylinder for the Starlab projector. She gave a cylinder as a gift to Broman for use by him and Per Broman in Sweden.

Per Broman reports that Broman Planetarium set up the largest to date Eurodome fabric planetarium dome at Tuorla Observatory/Opentein in Pietikäinen Finland in July. The dome is 7.5-m (25-ft) and will be used together with a Digistar-3 projector. For more information, contact Observatory Director Aimo Sillanpää, aimosill@utu.fi.

Southwestern Association of Planetariums

Two planetarians were awarded the Paul Campbell Fellowship award at the 2008 SEPA conference held in Lafayette, Louisiana July. Carole Holmberg and April Whitt were accorded SEPA’s highest honor for their many years of efforts on behalf of the organization.

The Western Alliance of Planetariums, comprising Great Plains Planetarium Association, Pacific Planetarium Association, Rocky Mountain Planetarium Association, and Southwestern Association of Planetariums, will join SEPA for a grand conference 16-20 June 2009. Conference host is Kris McCall at the new 18-m (60-ft) GOTO Hybrid Theater in Nashville, Tennessee. Detailed conference information will be available soon. For more information about SEPA, please visit the website sepadomes.org.

Southeastern Planetarium Association

The Paul 2008 Conference saw SWAPers joining friends and business associates. 2008-2010 SWAP officers were elected as follows: Cory Stone, president; Mike Hibbs, vice president; Barbara Baber, secretary-treasurer; Linda Krouse, IPS representative; Dr. Scott Austin, member at large.

The Local Group of planetarians in the Dallas/Ft. Worth metroplex joined hosts Chris Littler, Astronomy Department chair at the University of North Texas and Ron Dilullo and Don Garland from the UNT Observatory for an evening at the observatory after a Texas barbeque dinner.

In attendance were Cory Stone, Gene Roddenberry Planetarium, El Paso; John Pogue, out of retirement at the 3RF Comanche Springs Astronomy Campus in Northwest Texas, his wife Ann and grandson Sean Allen; John Cotton and Carol Jordan, Dallas Museum of Nature & Science; Donna Pierce, Highland Park Planetarium, Dallas and UNT grandson Justin Pierce and girlfriend Catherine Hagar; Chuck Rau, Mayborn Planetarium, Killearne and girlfriend Lynn; Amy Wilder and Hickory Smith, University of Texas-Arlington; Paul Ballou, Mesquite Independent School District Planetarium; Steve Baglow and his five children, St. Mark’s School of Texas Planetarium; and Patsy Patten and members of the Astronomy Club at Highland Park High School.

John Pogue’s “3RF” stand for 3 Rivers Foundation for the Arts & Sciences (arts headquartered at Quannah, Texas and the sciences at Crowell, Texas, a non-profit organization dedicated to serving schools and communities in Texas by providing activities and experiences they might not otherwise access. Their prime project has been the construction of Comanche Springs Astronomy Campus, located deep in the heart of isolated ranch land with an extremely dark night sky! For additional information go to www.3RF.org.

The economy is hitting some SWAP members extra hard as Jim McConnell reported the Richardson ISD Planetarium going on a year-to-year contract and Wilgus Burton, Garland ISD Planetarium, will be teaching an astronomy course added to his director duties. SWAP passed along best wishes to Gail Chaid (Independence Planetarium, San Jose, California) the very best in keeping her facility opened during these trying times. (Update: See page 5.)

George Owen, Beaumont Planetarium, recently visited Dallas-Ft. Worth planetariums, and Wayne Harris-Wyrick (Kirkpatrick Planetarium, Oklahoma City) and Lynn Moroney (StoryTeller, Oklahoma City) were visited recently by Pierce. Former SWAPer Larry Krumenaker earned his doctorate last winter. His survey on high school astronomy courses gave some very interesting results. Contact Krumenaker at larrykga@mindspring.com for this information. He is seeking information on a national syllabus for these courses.

Gerardo Perez reports an extremely busy year at TX A&M International University Planetarium—their third year in operation!
Under the Weather!

“Sesame Street in Outer Space”
- The New York Times
far-reaching effect throughout Ontario.

Seven teachers who do astronomy programs and operate the museum’s three STARLABs—two 4.8 m (16-ft) and one 6.7-m (22-ft)—have kept astronomy education alive and well in Toronto and all over Ontario. The museum’s extensive portable planetarium program serves clients in the museum and through two major outreach programs. All of their school programs are aligned with the Ontario mandated curriculum.

Students can experience lessons in the STARLAB on topics that relate to purpose of their museum visit, or use the facility when it travels to schools, community groups, museums, libraries, and parks.

There are two options when they are “on the road.” The STARLAB can arrive at a location with a teacher-assisted program; in this case an astronomy teacher arrives with the 22-ft lab. STARLAB can also be borrowed for an unassisted program. After training, teachers, librarians, park officials, and/or other leaders can present their own programs in the 16-ft STARLAB and even use it as a way to raise funds for an organization.

Congratulations to my old friend Ian McGregor and his colleagues for doing such a fine job of keeping the planetarium spirit alive at the ROM! www.rom.on.ca/schools/starlab.php

About Science First/STARLAB:

When the announcement was made that Learning Technologies, Inc. had been sold, at first it seemed like a major shake-up in the portable planetarium world. But after speaking with former owner Jane Sadler and the staff of Science First, the new owner of LTI, it seems like it will be business as usual!

Science First explains:

“After 30 years, the well-regarded designer and manufacturer of the STARLAB has changed hands, but it remains very much a family affair. Prior owners Phil and Jane Sadler have moved on to other interests while Science First, a Buffalo (New York)-based manufacturer of science education equipment, plans to build on their stellar reputation.

“Nancy Bell, the current president, assumed the operation of Science First with three of her four children after the untimely death of her late husband, scientist Raymond J. Bell. Son Aaron (MBA, biology) serves as vice president; daughter Jocelyn (PhD mathematics) is treasurer, and son Nathaniel Bell has just joined the team as technical support. Another family member is Sarah Bell, (BS chemistry), Aaron’s wife, who handles international sales for the combined range of product lines. (Nancy’s fourth child, Colleen, is a third year medical school student who regards her many stints as summer warehouse assistant as relaxing, in comparison.)

“This is not Science First’s first foray into the manufacture of astronomy teaching aids. In 2000 Science First was fortunate enough to have acquired—from yet another founding family—the world-renowned line of Trippens EE planetariums, which create the motions of the Earth, sun and moon simultaneously.

“Science First is a well-established member of the education community. Founded in 1960 by the late Frank Lee, a college professor (the current president’s father), it is a Women’s Business Enterprise (WBE)-certified designer, manufacturer, and marketer of equipment for teaching fundamental scientific principles of physics, environmental science, astronomy and technology.

“The team is rounded out by Bruce Izard, Carol Welsh, Joseph Welsh, Jenelle Papin, and Scott Marsh. Carol and Joe, a mother and son marketing team, will join National Sales Manager Reed Varian in attending trade shows and training sessions.
"The highly-skilled production staff has been with the firm for many years and takes pride in producing handsome, accurate and practical products that are an asset to the classroom.

"Jane Sadler, former owner, remains a consultant whose expertise and enthusiasm will serve as an inspiration in the months and years to come.

"Science First/STARLAB hopes to meet many of the devoted STARLAB customers by phone, email or in person. We look forward to developing as warm a working relationship as has existed with Jane Sadler and her team in the past."

Please note that LTI has been relocated to Buffalo, New York, so you’ll need to update your contact information: Science First/STARLAB, 95 Botsford Place, Buffalo, New York 14216-2696; Phone: 800-537-8703 (U.S. only) or 1-716-874-0133. The company can still be reached at starlab@starlab.com; the web address is www.starlab.com.

**New Teacher’s Guide, Activity Sampler**

Ralph Levy sent me a copy of new 96-page teacher’s guide for planetarium educators. I have worked with the author before and enjoy his clear writing style. This book is a brief practical guide to astronomy and the night sky. It was written specifically for teachers and users of portable planetariums and it covers the basic principles of celestial navigation, moon phases and eclipses, the solar system and deep space, as well as how to buy a telescope. This guide is written in English.

Ralph wrote, "Each chapter is accompanied by practical activities suitable for the classroom, a shadowy backyard or the planetarium’s artificial night. Each activity shows the intended age range and syllabus topics that apply. If a trip to the planetarium is planned, some of these activities can be useful resources either as preparation or follow up."

"Author Pedro Saizar holds a PhD in astronomy and lives in Argentina’s Patagonia, where he works as a teacher and a science writer. He is the author of three other astronomy books (in the Spanish language)."

Ralph also sent me some detailed information on the three planetariums that his company makes available. He is serving a niche in the market of people who want a lower cost option. I had already heard of Cosmodyssey and Cubex and have kept up with their newest models, but I had not heard of one called the Canopus. You can find out more about these planetariums from his website, www.mmicorporation.com, or you can contact MMI Corporation at 2950 Wyman Parkway, Baltimore, Maryland 21211 USA; email: mail@mmicorporation.com. ☆

**Inspiration Under a Home-Made Dome**

Colleen McCurley, Bellefontaine, Ohio USA

While surfing the net to find out if there were any new portable planetariums being advertised, I somehow ran across the name of Colleen McCurley, who I found out is a member of the Christ Our King Church in Bellefontaine, Ohio in the United States.

I called her to find out more about her digital planetarium project and found that she ingeniously built her own planetarium for a specific event. The story is fascinating. I think you will appreciate her ingenuity and enjoy her writing style.

Colleen wrote to tell me the story. Her words follow:

Here begins the saga of my planetarium experience. The project originated with a question from my pastor: “Can you make one of these?”

A core leadership group from the church had just visited the planetarium at the Creation Museum in Petersburg, Kentucky. We were on a fact-finding and idea-inspiring mission for a summer education program that was to include a kick-off fair with displays, activities, food and entertainment centered on the theme of Biblical creation.

The pastor wanted the kick-off event to get people excited about learning. There would be six more weekly educational sessions offered at the church. The event would, of course, be open to the community and be totally free of charge—and no one would be holding out a donation bucket at the door either! That’s just the way we do things at my church.

"I was part of that core group as the go-to person for what they call “3-D art construction.” Past projects have included a 20-foot replica of the Eiffel Tower and an 18.3-m
It Makes the Cut

A few months later our core group was busy planning out our kick-off fair, which came to be called Creation Blast. My planetarium had made the cut and was actually a budget line item!

I began to research the internet for all the small planetarium designs I could find. Mostly I found inflatables and geodesic designs. I looked at the various projection systems available and became quite daunted by the expense. I decided to pursue spherical mirror projection since a fisheye lens alone would practically outspend my entire budget!

I was determined to do the best I could with what I could get. I bargained shopped for a Dell 5100MP® and got a good deal on a used unit. That got me at least in the ballpark for amateur planetarium projection.

The next step was the mirror.

First-surface mirrors were out of price range also, so I began to search for a high-quality security mirror as a stand in. I made contact with Replex Plastics in Mount Vernon, Ohio, not far from my town of in Ohio, Bellefontaine. Their representative graciously donated a 66-cm (26-in) quarter dome mirror to our project.

Now I had the two main components of the projection system. But what was I going to project? I knew that there were programs available like Stellarium that I could download and learn, but my production schedule was starting to tighten up. I decided to find some pre-warped footage and edit together 10 or 15 minutes of footage from that. Stellarium would have to wait for later in the summer.

During all this logistical planning on the guts of the planetarium, I was also brainstorming on the construction of the dome itself. Creation Blast would no doubt attract several hundred people, judging from the attendance estimates of past projects we opened to the community. My dome had to be durable and safe for that kind of traffic.

My husband and I are self-employed and work a lot with construction projects, so I had a good source of inexpensive lumber readily available. I decided to make the base out of a 2x6 stud wall for stability.

Building in the Basement

I found a box manufacturer nearby as a source of large sheets of cardboard and decided to draw on the work of cartographers of the past and make my dome out of 12 cardboard gores that would meet at the pole.

I knew that I would not be able to construct the entire planetarium in place since the church would not be available for set up until only a week before the event. I would have to design and construct the top of the dome somewhere else to test my projection system.

We just happened to be building a house at the time with a basement large enough to house a 16-foot diameter dome, so I created a workshop and began construction of the dome there.

Somehow, I didn’t quite get the geometry quite right for the gores, but I got close enough to at least fit the twelve pieces together and then custom cut and fit the cardboard to make a semi-smooth dome surface. I painted the major part of the cardboard flat grey but left the seams to paint after the final taping.

The gores were actually constructed in two parts - one extended 8 feet up the surface of the sphere where it met a final sliver that finished the cap. I taped and painted the cap pieces all together since they were the most difficult to fit together smoothly. The cap would be transported as one big piece.

I used PVC pipe to construct a kind of exoskeleton to keep the dome from collapsing. It would also serve as a framework to help support the dome when we had to lift it up onto the 2x6 wall during final construction at the church.

After many days of design, re-design, and finally successful construction, I was ready to do a test on my projection system.

Of course, the dome was sitting directly on the floor, as were the mirror and projector, so I was not able to get the projection to reach all the way down to the true springline of the dome. But I saw enough to know that hey, this thing will work!

Deadline’s Approaching

Set-up week was coming upon me fast. I took down the dome and numbered all the pieces for reconstruction. Then I began cutting the lumber to make the 2x6 walls. I simply made a 12-sided polygon base and top plate with 2x6 columns at the vertices.

Then I designed an entrance foyer that would also be the anchor for my equipment stand. I did not have a two-mirror system, so I knew I would need the projector to sit about 4 or 5 ft (1.2 to 1.5 m) out into the dome. My husband suggested that we cantilever a set of 2x4’s from the roof of the entrance foyer out into the dome for the projector perch.

Finally it was time to move everything over the church multi-purpose room and begin construction.

We laid out some black carpet that had been recycled from a previous project. It became the floor of the planetarium. The dome was constructed nearby on a sheet of plastic since I had to finish painting all the seams af-
I had planned in a stiffening row of PVC about 2 ft (.6 m) up from the springline to help keep the dome in shape when we lifted it up. However, I didn’t take into account the additional forces that it would add into the sphere’s geometry. As a result I had to do a bit of adjusting and redesigning at the last minute when the cardboard gores were put in place, which compromised the smooth interior of the dome. Given the chance to do it again, I would design the extra ring or two of PVC into construction of the exoskeleton from the beginning.

But all in all the reconstruction went well, and within two days, after more taping and painting, we were ready to hoist the dome onto the base. A scissor lift with a homemade jib and tackle rig did that job well.

The Final Touches

Once the dome was secured on top of the 2x6 base wall, final touches included: wrapping the base in cardboard; painting any exposed wood or cardboard black; hanging black curtains between the studs as sound traps; installing a ring of acoustical foam painted grey at the springline to block light and trap sound; and patching any damaged seams and touch up painting.

The day before Blast the art department took over and painted the entire exterior of the dome and wall to represent the Earth, complete with polar ice cap.

We decided to add an exit foyer as a safety and traffic flow measure. My husband cleverly crafted that completely out of cardboard.

While the final stages of painting were finishing up, I was in the production room rendering the final version of our show footage. I took the best of all the pre-warped footage I had and set it to music. I decided not to get too technical or hyper-educational with a narrated script, but to just let the planetarium speak for itself.

I had footage of all different kinds of celestial scenery, including a flight through the universe. But I also included several landscapes, a trip underwater, a dive into a Petri dish full of bacteria, and a rollercoaster ride through a DNA strand. That way I was able to show the wonders of creation from atomic to astronomic—all in 15 minutes!

Around midnight the night before the Blast I brought in the mirror and projector. I hadn’t been able to get into the dome and do any serious set up until the paint crew left. I finally began getting the guts installed into the planetarium.

The cantilevered 2x4’s placed the projector at a good height in relation to the mirror, but I had to elevate the mirror above the top of the wall and the ring of acoustical foam. I ran to the church kitchen for whatever looked like it was about the right height and came up with some inverted drinking glasses. These actually did the job and stayed in place for the duration of the dome’s operation the next day!

At Last: Fulldome!

It took a few minutes of adjusting the projector and mirror to get the right alignment. I did not have the luxury of the elaborate mathematical computations for positioning the projector beam azimuth, etc., etc., including things I did not even have a chance to comprehend let alone implement. But whether by dumb fortune or divine intervention, I was able to get a fulldome projection with a level springline and minimal distortion, drinking glasses and all.

It was Saturday morning at 3 a.m.—7 hours to “blast” off. I'm still in the production room rendering film onto a DVD. No problem. I've been in this position before!

I had already tested the projection onto the dome and miraculously (literally, I believe) everything was working very well.

Saturday morning at 9 a.m.—one hour till doors open to the exhibit hall for Blast. My husband is across town purchasing a new DVD player with the proper S-video output. With a change of hats I’m back in the production room finishing up a music project for the concert for later in the day during lunch, which was also free.”

Saturday morning at 9:55 a.m.—the planetarium DVD is finally in the player and projecting. I breathe a sigh of relief.

The ladders were removed from the dome and in went a few folding chairs and about a dozen video chairs and beanbags. The ushers were stationed at entrance and exit and the doors, or rather curtains, opened.

Best estimates put dome attendance during the Creation Blast at around 400 visitors. And no one asked for a refund!

Susan, this whole planetarium project has been one of the most enriching experiences of this sort yet for me. I’ve had to learn how to do a lot of new things to accomplish some of the tasks I’ve been assigned, but this planetarium has taken me farther than any of them. The geometry alone was quite the trip back to high school for me!

I got to learn about all the wonderful things that people have done with dome projection and how it has developed over the years. Since my “early days” at the Spitz planetarium in Miami, computers have taken over much of the projection duties. Now anyone with a decent laptop and media projector can have the thrill of creating their own flight through the universe and wherever their imaginations can take them.

Viva la planetariums!

Susan back here. I was intrigued by the other activities that went on in conjunction with the planetarium shows. When asked about this Colleen replied:

“The whole Blast experience began in the main auditorium of the church, where an introductory DVD was shown at the top of each hour starring some of the performers that the visitors would see throughout the day. Then, for the rest of the hour, educational short films were shown. People were free to stay and watch or leave and go explore. Another room had a longer feature film for those intellectuals who would rather learn than play!

“The multi-purpose room at the church was the site of the educational fair part of Blast. The planetarium stayed busy all day with about 15 or 20 people in the dome each 15 minutes. The dome was flanked by a rainforest jungle where a ‘hide-the-tiger’ game took place. On the other side was Animal Golf (putt-putt...
The projection system was mounted over the entrance to the dome.

style. Also on the floor was a parachute activity that was very popular. The properties of air were explored, but mostly the folks got into ‘parachute volleyball,’ which was very entertaining.

There was a flashlight tent where beams of colored light were mixed. At one stop kids could crack open geodes and find crystals.

When I asked what the future of the planetarium would be, Colleen answered “Looks like the planetarium will get some more use this summer for Creation Journey; the director asked me to prepare a show that will display the constellations. I think that Stellarium will help me do that. I just need to get into the program and learn it.

“If you have anyone who knows Stellarium very well and could help me get jump started I’d be grateful for the contact! I’ll be asking my small planetarium forum group for help also.

“We have a group of fisherman coming into the church for a meeting and a meal. They’ll be in a fishing tournament here in the area. I’ll try to have a show up and running in the dome for them that uses some underwater footage I have. If I loop a small segment they can just wander through at their leisure.

“I’m not exactly sure of the dome’s future. We toyed with the idea of posting it on eBay to see if someone would come get it! My husband liked that idea since he will have to help me take it apart. I don’t think the dome would hold up to another reconstruction, but the base would be okay to use again. I’d really like to redesign the dome with a different material, perhaps sheets of insulation foam. That would make it more durable and easier to store and reconstruct later on.”

You can contact Colleen at colleenmccurley@earthlink.net.

I sent Colleen a contact for help with Stellarium and thanked her for sharing her amazing experience—building her own planetarium!

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September 2008 Planetarian 79
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TEACH bigger than ever before

Introducing the SciDome HD high definition fulldome system powered by Starry Night. The new HD system displays over 3 million pixels, delivering three times the resolution of the standard SciDome. With easy-to-use controls, and an auto-align feature that calibrates the color, brightness and dome registration with the push of a button, SciDome HD is the perfect system for classroom presentations. SciDome includes the Starry Night space science curriculum, with teachers' guides, lessons correlated to state standards, discussion questions and activities.
When we moved to Chicago in 1984 and Larry Ciupik at the Adler asked me about how one could balance an egg on the equinox, I was sure he was teasing the new kid. I had never heard of balancing an egg on the equinox, let alone any other day of the year. I know now, of course, that the myth of the equinox egg balance is awfully unbalanced, but you can be assured that we do have a rather nice balance of books in this column.

Many thanks to our reviewers: Steve Case, Francine Jackson, Colin Johnston, Fran Ratka, and Richard Walker.

Deep Space
The NASA Mission Reports Series, and is a remarkably complete compilation of information about all of the deep space probes. Pioneer 10 & 11, Voyager 1 & 2, Galileo, Cassini, NEAR, Stardust, and Deep Space One are all included. There is also a section covering future deep space missions. Deep Impact and Dawn were future missions at the time the book was published, so those sections are not current.

Each section contains the general NASA press release and mission profile. Mission personnel are listed, as well as the experiments to be performed, timelines, and detailed descriptions of each spacecraft. Background information about the target is discussed and a full report on data received from the probe until the time of publishing is included. There are many great diagrams and pictures.

Included with the book is a two-sided DVD containing video of launches with explanations of details of the missions by NASA scientists, artists' renditions of different phases of the missions, still images taken by the probes, and mission validation reports. Since all of this wonderful work is public domain, it can be used in planetarium programs and lessons for students.

This is a great reference book for any teacher, scientist, or planetarian that wants to have space exploration information available for students, audiences and themselves. My astronomy students have already used the book as a reference for their planet reports.

It’s About Time: Understanding Einstein’s Relativity

The author, in his first sentence to the reader, asks, “Why another relativity book?” And, indeed, that thought does come to mind. But then his real reasons are revealed: First, 2005 was the 100th anniversary of Einstein’s special theory of relativity; secondly, 2005 was the 40th anniversary of the author’s first physics class as an assistant professor at Cornell; and, third, Mermin said he feels that relativity should be taught in high school, so he decided to write a book for that audience.

To do so, a couple caveats—according to Mermin—come to mind. First of all, he wants the math to be understood by a high school student, so there’s nothing above basic algebra; in fact, most of it is at a lower level than that. What this does, of course, is occasionally take forever to get to the point. Also, he worries that a high school student would have a problem with the concept of nothing traveling faster than light, resulting in longer explanations of high-end travel.

Mermin also brings in a “trick” that is reminiscent of my college French class. For some reason, he decided to give names to the “passengers” in his relativistic travels. Therefore, we find ourselves trying to keep Alice, Bob, Chuck and Carol, etc., straight in our minds. The author felt this was “much more pleasant to talk about than ‘Frame [of Reference] A,’ ‘Frame B.’” It reminds me of my French intransitive verbs. To this day, I can remember “Alice and Emily,” but don’t ask me what verbs the names represent.

Actually, all in all, the book was a better read than many relativity books out there, but
I was kind of surprised that, in the beginning, Mermin seems to imply that he is writing this as a high school text. Granted, this book should be understood by that age group, but there are no exercises, chapter recap, or bibliography at the ends of the chapters. I was let down. If Mermin did want to push for this discipline at that age level, that he should have prepared a ready-made text for that purpose.

Regardless, if you want a book that introduces relativity rather well and you like trains (as all the examples in the book are balls and photons being released from various train cars), this is a good choice.

**Stars & Planets, A Princeton Field Guide**

Reviewed by Richard Walker, Longway Planetarium, Flint, Michigan, USA

Like other “field guides,” Stars & Planets includes charts and maps of the sky and a basic astronomy primer.

Let’s start with Section Two, the basic astronomy section. It is well written, easy to read, and very well illustrated with many diagrams and photos that help to explain the text. At 125 pages it is complete and does a very nice job of explaining a great many topics.

Now on to the meat of this field guide: the charts and maps.

The monthly sky charts, for both northern and southern latitudes, are detailed enough to allow you to learn the night sky or to identify what you are looking at. They are set up in a way that makes sense to me. Facing pages are the northern and southern halves of the same sky for a particular month and hemisphere.

The maps for the constellations and the explanatory text for each map make up the bulk of this book. With a slightly larger format (each page is 8 x 5 inches) than other field guides, each of the 88 constellations has its own page with an accompanying page, more or less. The more obscure Equuleus gets a half page; Sagittarius gets two pages plus photos of interesting objects.

The larger format makes the maps very usable. There is plenty of detail. For small and medium telescopes and beginners, these charts would be all that is needed to get a great start in finding a variety of deep sky objects.

However, I do wish the charts had slightly more contrast. They are printed with white stars on a light blue background. For my aging eyes, a darker background would have made them easier to read. This is true for both white light and red light.

The photographs included with the maps are from professional observatories and do not reflect what you can expect to see through a telescope. This can lead to major disappointment for beginners.

My biggest complaint is the binding of the book. It is a normal, traditional binding. To get it to lie flat so that it can be used at a telescope, you need to break the binding, as I did. A spiral or loose leaf binding would have made it infinitely more usable.

Everything considered, Stars & Planets is going into my glove box as a permanent addition for public star parties, or for those times when I forget the big books, or just for those fishing trips when astronomy is a sideline activity.

**Star Maps: History, Artistry, and Cartography**

Reviewed by Steve Case, Strickler Planetarium, Bourbonnais, Illinois, USA

Nick Kanas is a medical doctor with a passion for antique star maps. His enthusiasm for the field and his breadth of knowledge are apparent in this work, which he states was written to fill a void in discussions of this topic by tracing the historic development of star maps, the technology of their manufacture, and the role they have played in illustrating our changing views of the universe. I agree that such a book would be a powerful one and would be especially helpful to those wishing to bring the history and artistry of these works to a planetarium dome. However, while Kanas’ work is certainly a step in the right direction, I don’t believe his work has fully met these goals.

Star Maps reads more like one of the catalogues the author states he has attempted to replace. Though the introductory chapters discuss the development of European and non-European cosmology, there is little that will be new to an astronomy student or enthusiast. The remainder of the book contains brief bios of the astronomers and artists who created significant maps and, while it does in limited respects explore developments common to maps of different time periods, it seems largely episodic, disconnected, and often rather dry. Of useful information there is no shortage, but the book should be viewed as a reference primarily instead of (as the author seemed to have hoped) a popular history of the topic.

This seems to me a shame, because this topic is a goldmine for connecting astronomical themes to the wider fields of art, history, and map-making. Throughout the book I often found myself wishing it had been organized in a more topical and compelling manner. For example, in the chapter on European constellation development, it would have been very interesting and (in my opinion) more accessible to trace the evolution of a few well-known constellations in star maps down through the years. Instead, the chapter reads like a catalogue with lists of star maps, information about who created them and when, and more lists of which constellations they contained or did not contain.

As is fitting for a history of star maps, Kanas’ book is a wealth of beautiful and well-reproduced images. However, even here there is room for improvement, though perhaps the topic itself makes evaluation unfair because there is so much that could have been done. The book contains three sections of color reproductions, but since they are only reproductions of black and white images already found in the text, I couldn’t help wanting more.
Why Aren’t They Here?: The Question of Life on Other Worlds
Reviewed by Colin Johnston, Armagh Planetarium, Armagh, United Kingdom.

We live in a vast galaxy of stars circled by planets. The ingredients of life seem common throughout space and there are no technological obstacles to transmitting signals across interstellar distances. Even interstellar travel is a distant possibility. Yet our skies are silent, undisturbed by alien greetings, never mind alien spaceships. This is the Fermi Paradox. Anyone interested in the possibilities of life elsewhere in the universe (and from their questions, many of the visitors to planetariums are) will enjoy Surendra Verma’s Why Aren’t They Here? This book is a good start if you are getting interested in the enigma of the Fermi Paradox and a fun read even if you are already well-versed in the controversies of SETI and exobiology.

In a chatty narrative which starts by following a roughly historical course, the author introduces ideas on the existence of other worlds from Aristotle onwards, theories on the origin of Earthly life, the search for life on Mars, and how we could potentially find or even communicate with life elsewhere. This is not a linear history by any means; there are numerous detours from the story when the author shares anecdotes about the personalities involved in this quixotic quest.

Occasionally the book rambles a little too far off course with entertaining material that is very fascinating—such as the accounts of the rival claims for priority on the discovery of Neptune or the sample of physicist James Clerk Maxwell’s poetry—but some readers may feel as though they belong somewhere else. You will find all the usual SETI topics covered here: Frank Drake and his equation, the “Wow signal,” the zoo hypothesis, Frank Tipler’s argument against the existence of ET intelligence, and so on. If these are not familiar terms, you really need to read this book!

The book is very up to date, covering, for example, Ray Kurzweil’s promotion of the idea that organic and machine intelligences will ultimately fuse together in the “Singularity” and the recent sensational, but alas dubious, reports from India of alien microbes descending in red rain.

Sadly, the publishers seem to have neglected the editing and proofreading processes; there are occasional obvious howlers (the Arecibo message contained just 179 bits), but I would not be put off by this. I learned a lot from this book. It is a hugely enjoyable and thought-provoking read which leaves the titular question open but suggests many possible answers.

Skylore from Planet Earth: Milky Way
Reviewed by April Whitt, Fernbank Science Center, Atlanta, Georgia, USA.

This third in Dayle Brown’s beautiful series of Skylore books may well be my favorite. Fifteen stories collected from six continents show the wonderful cultural similarities and differences we humans share. I recommend it for planetarians, teachers in science, reading or social studies, and families. If we had a gift shop here at Fernbank, I’d recommend it for sale here, too.

Each story is on a single page, bordered by images from that story or culture, with a facing full-page watercolor image. Some of the stories were familiar: the Cherokee “spirit dog” spilling cornmeal as he escapes across the night sky, the Estonian story of Lindu’s Veil that I first heard Gary Lazich tell at a long-ago conference, the story of the ashes from the San in South Africa.

But there are new ones as well. The Incan story tells of a foolish fox, leading a group of animals up an irrigation canal, imagined as the “dark constellations” along the southern Milky Way. The Silver River story from Japan is beautifully illustrated with silver fish trying to avoid the crescent moon “hook.” In Polynesia, a great blue shark swims safely along his sky river.

An excellent reader’s guide is available from the author as well (email her at dayledavid@comcast.net). Background information about the stories, activities and worksheets, and correlation of the stories with a variety of (US) National Education Standards across disciplines enhances this collection of sky tales.
What’s New

John Schroer
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The Digistar 4 Arrives
Evans and Sutherland has a new planetarium/fulldome system–Digistar 4. This new system has a new user interface, based on a new philosophy on how planetarians will use all of the features available in these fulldome video systems. While most systems share drag and drop capabilities, pull down menus, and other graphical features, the folks at E&S wanted to create a more “humane” interface for their Digistar system.

Digistar 4 includes two large flat panel touch screen displays, with the second display being used as a preview screen for what is being projected on your dome. D4 will include drag and drop capability for easy show productions, and a timeline to drag and drop all sorts of visual and audio data necessary to create your own planetarium show. A view of the control panel is in Figure 1.

Organization
The first concern to be addressed was the method to organize the different data sets, such as still images, video clips, animations, pre-rendered videos, 3D models, and celestial databases such as Digital Universe. E&S solved this problem by creating a library that can be browsed via a graphical interface and can be dragged and dropped onto a preview dome window. This preview window permits the user to modify, on the fly, the appearance on the dome to suit the user’s purposes.

In a change of perspective concerning how a full dome system is used in a planetarium setting, a great deal of effort was invested in creating an enhanced control system for real time planetarium shows. D4 has the ability to display the evening sky over a particular location and constellation outlines and artwork. D4 reads .xml data now included in deep sky images of clusters, nebulae, and galaxies from NASA and other astronomical organizations, and knows exactly where the image is located in the night sky. This permits the planetarium presenter to point out a deep sky object, and then display an image of that object as seen through a telescope.

In addition, D4 uses open source plug-in software to display any type of data; handles both video and audio in the digital domain, and has stereo 3D options using either active stereo LCD shutter glasses, INFITEC Stereo Color Notch Filter glasses, or enhanced color anaglyph glasses. All stereo 3D options are supported in real time and fulldome video modes.

A planetarian is able to control D4 via a wireless connection to a tablet PC for live sky show control, anywhere in your theater. The D4 is available with a variety of projectors, including the E&S Laser Projector, Sony SXRD, JVC D-ILA high contrast, DLP, or E&S SP2HD projectors.

E&S also continues to offer the Digistar Users Group, where other Digistar users share ideas, information, programming, and imagery. I have heard a lot of positive feedback from planetarians attending the 2008 IPS conference in Chicago about Digistar 4.

My Views ...
While it is apparent that other fulldome system manufacturers will continue to upgrade their systems with some of these features, E&S has laid down the gauntlet with a fulldome system made for astronomy education, and not yet another IMAX dome clone. While I appreciate the fulldome pre-rendered shows produced for the fulldome community, it must be said that we are part of the astronomy education and planetarium field, not the giant screen cinema association. The planetarium community, no matter what technology is used in the planetarium theater, must never leave our original mission behind—to introduce and encourage our visitors to discover and enjoy the beauty of the universe that we are able to see from our little blue-green world.

For more information, contact Michael Daut or Jeri Panek at Evans and Sutherland, 770 Komas Drive, Salt Lake City, Utah 84108 USA; +1 801-588-1000.

GeoGraphics Offers Tunguska
It was 100 years ago, around 7:14 a.m. local solar time on June 30, 1908, when a meteoroid or comet fragment, estimated to be a few tens of meters across, created an air burst some 5-10 km above Earth’s surface in remote Siberia. Known as the Tunguska Event, the detonation leveled 2000 square kilometers of forest with an estimated blast equivalent to more than 20 million tons of TNT.

GeoGraphics Imaging has released two new fulldome animation clips, in addition to their “flat screen” clips, depicting the event, based on their GeoGraphics Offers Tunguska event. Image by Joe Tucciarone
Planetarians’ Calendar of Events

2008


2009

International Year of Astronomy


18-19 April. Italian Association of Planetaria (PLANIT), XXIV National Conference, Naples, City of Science, Italy. www.planetaritaliani.it. Contact: osservatorio@serafinozani.it.

13-16 May. Middle Atlantic Planetarium Society Conference (MAPS), Howard B. Owens Science Center in Lanham-Seabrook, Maryland, USA. The Owens Science Center hosted previously in 2003, and since that time they have developed and extended their partnerships with nearby organizations of interest, such as NASA-Goddard and the Johns Hopkins University Applied Physics Lab (JHUAPL). Side trips to other local planetariums such as Baltimore or Washington are possible. This location also offers access to a wide variety of speakers from both NASA-Goddard and JHUAPL. www.maps-planetarium.org


11 July, total solar eclipse

Deadlines for “A Week in Italy”

30 September, planetarians from Spain
15 April 2009, planetarians from United States

For more information on the “Week in Italy,” go to: www.astrofilibresciani.it/Planetari/Week_in_Italy/-Week_Italy.htm

For corrections and new information for the Calendar of Events, please send a message to Loris Ramponi at info@serafinozani.it. More details about several of these upcoming events is included in the International News column. The most up-to-date information also is available online at the International Planetarian’s Calendar of Events at www.astrofilibresciani.it/Planetari/Internationala_Calendar.htm

Past President Patty Seaton will host the conference at the Howard B. Owens Science Center in Lanham-Seabrook, Maryland, USA. The Owens Science Center hosted previously in 2003, and since that time they have developed and extended their partnerships with nearby organizations of interest, such as NASA-Goddard and the Johns Hopkins University Applied Physics Lab (JHUAPL). Side trips to other local planetariums such as Baltimore or Washington are possible. This location also offers access to a wide variety of speakers from both NASA-Goddard and JHUAPL.
The September issue 25 years ago had a letter from James Rusk (Russell Planetarium, Mesquite, Texas) commenting on the article in the January issue on beliefs in effects of the full moon. Boyd Mathias of the University of the Pacific had a letter regarding typewriter elements with special symbols, such as Greek letters and mathematical or physics symbols.

There was a short report on the joint meeting of the Great Lakes Planetarium Association and the Middle Atlantic Planetarium Society at the Strasenburgh Planetarium in Rochester, New York.

A paper originally presented at the Pacific Planetarium Association conference in May 1983, from Michael Chriss of the College of San Mateo in California, looked at “Science and Nonsense: An Issue for Our Time” (and, unfortunately, ours also).

Chriss wrote “A local Bay Area community college sent me a catalog of their course fare. Prominently featured was a full page of courses given in ‘psychic phenomenon’ (sic). The student could choose from among a Barnum of knowledge ...” Among the titles were “Journey of Reincarnation—Past Life Explorations,” “Contacting Your Spirit Guides,” “Cleansing and Balancing Your Chakras,” and more. The author asks us to “find ourselves offering, equally, courses in Creation Science, along with Darwin, astrology, Velikovsky, and von Däniken along with astronomy?” He concludes with a call for an equivalent to a Hippocratic oath in our teaching.

(Immanuel Velikovsky, who died in 1979, wrote controversial books that reinterpreted history, including the 1950 Worlds in Collision that so incensed Harlow Shapley that he led a vocal campaign against him. Prolific author Erich von Däniken is best known for his championing of extraterrestrial assistance in early human affairs; Chariots of the Gods? in 1969 is perhaps his best-known work. At least Velikovsky and von Däniken are finally receding for the public mind.)

Lisa Hooker (Mueller Planetarium, University of Nebraska in Lincoln) wrote on public relations techniques for the planetarium, many of which are still applicable today. Advertising for those with money needs to be placed where it reaches those interested, while free promos and PSAs (public service announcements) can get onto local radio and television stations (and today, cable).

Interestingly, most newspaper and general circulation magazines assume no more than a sixth grade reading level from their adult audiences, so Hooker suggests that general audience planetarium shows should be written at that level also. Among other characteristics, this means being concrete and basic, rather than complex and abstract and age-appropriate entertainment for teens, with more informational material for adults. Identified special interest groups include scouts and local astronomy clubs. (I even had the local astrologers' guild come in once!)

Catherine Buckley of Reno, Nevada, a self-identified outsider to the planetarium field, addressed us on an outsiders' perceptions and experiences in nearly a dozen planetariums in various parts of the United States. She is an enthusiast, but one who noted and was prepared to describe what she sees as “deficiencies.”

First is not offering new shows often enough to keep drawing people back. Next, she likes simple exhibits associated with the planetarium, especially those that do something and are interactive. Good exhibits include science fiction, movies, and exhibits created by local school children, especially those relating either to the current public show or to news events involving astronomy and space. Bad things she identified include calling attention to the star projector (which many planetarians seem to like to do); having wires, props, and other equipment exposed; having lighting that is too bright and light leaks (particularly from around the control panel); and running noisy equipment.

She identified bad scripts as those obviously padded because there is not enough to the topic for a full show (hey, people, point out the current night sky). She suggested having offers of free tickets to shows on local radio for the first five callers, or the first to call in and answer some trivia question.

The bulk of this issue was taken over by Charles Hagar (Planetarium Institute at San Francisco State University, California1), with two major articles. First was “Planetariums: Star Wars or Astronomy?” Hagar compared seeing Star Wars for the first time (doesn’t that just give you a feel for how long ago 1983 was?) against a planetarium show on black holes. His conclusion: “Folks, let’s stop trying to be George Lucas and instead become good astronomy interpreters to the public.” Hagar noted that he is not proposing a return to pedantic planetarium lectures for the public and notes that astronomy can be fun. “But, “[i]t is most unfortunate that the wide angle cinematic projectors...have become ‘the tail that wags the dog.’” (As I have long said, shows rest on three legs: science, drama and education, and need a proper balance.)

Hagar also had a lengthy article completing his “IPS Survey of the World’s Planetariums.” This part completed the report on 30-ft/9.1-m domes, covered those smaller than that, and then gave a general summary for the entire survey for all dome sizes. The analysis relates directors’ salary to dome size and numbers of full- and part-time employees to dome size.

Attendance size is analyzed several ways, including by manufacturer, of whom only

1By the way, the planetarium at San Francisco State University is now called the Charles F. Hagar Planetarium.
six are listed (Farquhar and Viewlex no longer being with us today). The types of use are shown (public shows, school groups, astronomy classes, other astronomical uses, and non-astronomical uses).

(The main problem in this survey is incomplete data, since it is assumed non-responding planetariums are statistically the same as those responding, a dubious assumption. No attempt is made to estimate this or any other possible sources of error. One can think of is Viewlex, which is represented by only 17 planetariums. I know that a single school district in the Bronx purchased 12, none of which is in the survey.)

IPS President Jeanne Bishop reported that the IPS Council would soon be selecting the site for the 1986 conference, as well as on such recurrent issues as the Script Bank, procedures for the Awards Committee, methods of aiding planetariums facing a crisis, and a proposal from NASA/Lewis to do a 28-minute video/film on planetariums, which seems never to have come to fruition.

Another idea not fully pursued came from Sam Storch of the E.R. Murrow High School Planetarium (now called the Edwin P. Hubble Planetarium), Brooklyn, New York, to have IPS sponsor articles in various journals seen by administrators and others with influence on planetariums’ survival, promoting their use and value.

Gibbous Gazette was a news summary, then done by John Wharton. He began with plans for a new edition of the Planetarium Directory. A major shake up at the Flandrau Planetarium (Tucson, Arizona) with the resignation of Dennis Mammana got a fairly thorough airing. Financial woes in Michigan had a lesser effect on the Abrams Planetarium (Michigan State University, East Lansing).

Planetariums in Canada and the U.K. were told how to obtain NASA films and other materials. Comet Halley’s impending apparition came in for some discussion, with a Hansen Planetarium (now the Clark Planetarium, in Salt Lake City, Utah) show on it being available for purchase soon.

A telescope manufacturer (one no longer around) asked IPS to answer astronomical questions they received from the public. Slides from results of the Einstein X-ray satellite were available. Tilted 23-m domes with GOTO projectors were being installed in Yokohama and Taiwan and a Digistar 23-m dome in The Hague.

Jack Dunn’s Regional Roundup reported on conferences held or planned around the USA, but no reports from outside it.

Kathleen Hedges (Griffith Planetarium, Los Angeles, California) had an education article describing how even large planetariums could have some interaction with general audiences and school groups.

Gerry Mallon2 asked for people to share lesson plans “developed and used successfully in their planetariums.”

James Brown did the “What’s New” column. This described STARLAB’s offering of nine cylinders. Stasiuk Enterprises was marketing five planetarium shows on topic as diverse as “ETs: Where Are They?” and “The Scorpio-Sagittariuss Connection.”

The Jane Geohagen’s Jane’s Corner column was largely devoted to the opening of and media hype surrounding the opening of the Universe, the Science Museum of Virginia’s new planetarium and Omnimax theaters in Richmond.

Out in space, the Soviet Union launched Cosmos satellites 1495 through 1501 during September, along with Zenit 24, Oktan 11, Argons 84 and 85, and an Okean and Ekran. The sole manned launch of the month was Soyuz-T10. The USA launched two communications satellites, Satcom 2R and Galaxy 2. "•

2 The planetarium at the Arcola Intermediate School in Norristown, Pennsylvania, now bears his name. Mallon was president-elect of the IPS when he passed away.

While responses to my question may lack in quantity, they lack nothing in quality. In fact, the second response gave me an idea for our next topic.

In 1675, Isaac Newton wrote in a letter to Robert Hooke, “If I have seen further it is by standing on the shoulders of giants.” I suspect each of us could say the same, so our next question takes the following form.

Who do you consider your mentor(s) in the planetarium field and what qualities did he/she/they help you develop?

For your response to receive consideration for inclusion, I must receive it no later than October 15. I would also appreciate your including your full address in case anyone wishes to comment on your response “off list.”

(What’s New, continued from page 84)

on the scientific data thought to surround the occurrence. Flat screen versions of the animations are offered at 720 x 480 resolutions up to 1280 x 720 hi-def. Fulldome sequences are available as 4K dome masters and in smaller sizes. All of GeoGraphics’ animations feature the talents of artist/ animator Joe Tucciarone.

GeoGraphics also provides astronomical clips for producers to help off-set productions costs by providing pre-rendered sequences. These clips are available for educators who need visuals to help explain various concepts. George and his staff are currently rendering many of their clips into fulldome format, which will be added to their fulldome library upon completion. Low resolution Quick Time movies of each sequence are available for preview on line at www.geographicsimaging.com.

For more information, contact George Fleenor at geographicsimage@aol.com. Full contact information: GeoGraphics Imaging & Consulting, 7803 25th Ave W., Bradenton, Florida 34209 USA; +1 941)-920-0246.

Galaxy Contact

A producer of astronomy and space images for 25 years, Galaxy Contact is conducting a liquidation sale on their products, including postcards, posters, photo prints, astronomy maps, etc. These products may be viewed at their web site www.spacephotos.com.

For more information, contact Jean-Marie Hagnere, director, Galaxy Contact, BP 26, 14 rue St Nicolas, 62101 Calais Cedex France; +33 359 70 13 93; contact@spacephotos.com.

Map Cards

A Czech company called Map Cards is offering what they call true 3D postcards, sized 148 by 105 mm. Images available include each planet of our solar system, the sun, and the entire solar system. They also have maps of daytime and nighttime Earth postcards, moon phase postcards, and book markers. You have a chance to see their products for yourself with the insert in this issue!

For more information, contact Map Cards at partners@mapcards.net or check their web site at www.macards.net.
In a discussion about fundamentalists who bring order.” And he listed some cultural similarities between cosmologists and cosmetologists: both have religious rituals, both have body adornment, both have marriage taboos, and both have alcoholic beverages. As a result, he pointed out, and encounter the person in the next seat who asks “What do you do for a living?”

We all know what happens if we reply “I’m an astronomer.” The response is, “Can you do my horoscope?” If you say you’re a physicist, they think you’re a psychic, and planetarians must work with plants. Rocky’s advice was, “If I don’t want to talk to them, I tell them I’m a theoretical physicist. If I do want to talk to them, I tell them I train dolphins.”

If he says he’s a cosmologist, they think “cosmetology.” He noted that both words have the same root, cosmos, meaning “to bring order.” And he listed some cultural similarities between cosmologists and cosmetologists: both have religious rituals, both have body adornment, both have marriage taboos, and both have alcoholic beverages.

In a discussion about fundamentalists who want equal time in the classroom for their creationist agenda (or whatever the current topic is), Dr. Kolb suggested that we remind them that gravity is only a theory, and that when they approach the edge of a cliff, they should “consider all possibilities.”

A 1909 photograph of the national basketball champions from the University of Chicago showed Edwin Hubble, who played forward on the team. Dr. Kolb commented, “This shows that scientists are just regular people. They could be starters on national sports teams. It happens often.”

A graph of the contents of the universe, with hydrogen and helium accounting for only 4% of the total, came with the comment, “This graph also illustrates why chemistry is not important.”

On a smaller-than-international scale, there was the Triple Conjunction last year, the meeting of three regional groups in the United States: Great Lakes Planetarium Association (GLPA), Middle Atlantic Planetarium Society (MAPS), and the Southeastern Planetarium Association (SEPA).

Jon Bell said that Ken Franklin had once given him advice for answering phone calls. “Just tell them that no matter what, the world is not going to end. When the world doesn’t end tomorrow, they’ll say ‘Hey! He was right!’ and if it does, there will be no one to point a finger.”

Door prizes. We got door prizes. Keith Johnson won a pair of Woodchuck mugs, most appropriate for his birthday on February 2.

Susan and Tom Button won identical calendars. When the digital-camera-and-binoculars prize came up, Tom said, “I’ll trade you for a calendar!” Someone suggested that he hang both calendars on the living room wall and enjoy stereo vision.

Pisgah Astronomy Research Institute (PARI) donated several Star Lab cylinders of the radio sky. Each was in a plain brown cardboard tub, similar to those in ice cream stores. When the cylinders came up for award, Ben Mendelson suggested giving out the strawberry flavor first.

Scale back to just one region in size:

Dave Hostetter and his team hosted a wonderful SEPA conference in Lafayette, Louisiana. Excellent food, excellent presentations, excellent speakers, and the friendliest, most helpful staff in the region. Dexter LeDoux just might be eligible for canonization. I saw two of the three miracles necessary, and Martin Ratcliffe commented, “If you’re ever on a mission to the moon and you have a problem, you want Dexter in the middle seat.”

Drew Gilmore, describing the opening of the Sudekum Planetarium in Nashville, Tennessee, reminded us that no matter what project we undertake, “You always need more time, you always need more staff, and you always need more Tylenol.”

Ken Brandt brought some lagniappe (how they say “a little something extra” in Louisiana) from NASA. Our conference name tags were in transparent plastic pockets on cords around our necks. Ken had his Solar System Ambassador name tag in the same pocket, and turned that tag forward during his talk, during which he was “now an agent of JPL.” Jason Talley asked, “Are you a double agent?”

More door prizes: Linda Hare had all our name tags in a box, and was randomly choosing them one at a time to award the prizes. Mickey Jo Sorrell wanted to win Dayle Brown’s book Skylore from Planet Earth: Milky Way, and called out to Linda to pick her name next. That book was the next prize. Linda pulled a tag from the box, looked at the name, and her mouth fell open in shock. Then she held the tag up for us all to see, with the exclamation, “Honest to God! It was Mickey’s!”

Laurent Pellerin wanted the case of telescope eyepieces and filters, a generous gift from Celestron. He asked Mickey Jo to call out again. “But it didn’t work,” he said. “She got the right planetarium, but the wrong person.” His assistant Kristin Fiaccattio won them.

Ken Miller won a fleece vest with the coveted Woodchuck logo. When someone asked, “What does a guy from Hawai‘i need with a fleece vest?” he replied, “For when I come to the d— mainland!”

Scale back now to Fernbank:

Competitors in the local Science Olympiad practice finding stars and constellations in our planetarium. When a parent or teacher calls asking for help with the “Starry Starry Night” section of the competition, we’re happy to set up an appointment between shows and help students identify objects in the sky. This past school year the two youngest students with whom we worked took first place in the statewide competition. What a joy to work with such exceptionally fine young people!
Dream it and we will deliver it

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