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June 2009  Vol. 38 No. 2

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On the Cover:
In the Canadian production of Galileo Live! the man of the year takes center stage, often amid immersive scenes shot on location in Italy. This is the Medici Chapel in Florence. Courtesy of Alan Dyer/TELUS World of Science-Calgary. Fore more, see International News on page 23.
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Ward Beecher Planetarium, has his new *Moonbound 2020: A Journey Decades in the Making* now available. I knew he had been working on it, but just learned through the wiki that it is finished. Valuable site, indeed.

The wiki has technical information, but no indication about the quality of the program. From personal knowledge I know some of them are very good, and others just aren’t.

When Steve Case, who was in the same situation as me when it comes to buying new shows, volunteered to write the column and potentially take the heat that comes with any kind of review, I was overjoyed. He’s a great writer and a careful reviewer.

### Always a Balancing Act

That brings me to my second position: I’m also an editor who needs to balance the needs of planetarians with the needs of our field’s vendors (and advertisers in the *Planetarian*, although that is not as vital a fact for this non-commercial, non-profit publication). They’re also friends, which always puts us both—planetarians and vendors—in delicate balancing situations of what’s right for our facilities vs. what we can afford vs. doing right by our vendors.

A review, by its very nature, is a statement of informed opinion arrived at by reading, seeing, or hearing the work being reviewed.

Steve admits he is still new to the field, and I find that to be one of his strengths. Before you argue this, remember that planetarium programs usually are a one-shot deal for most of our audiences. We have only once chance to capture their attention, educate them without boring them, and instill a desire for them to return to our facility for more. There are rare people who come back to see a show a second or third time, but you’ll have to admit they are rare (but highly valued) birds.

Steve is being a good reviewer when he watches the program and gives his first impression, he’s giving us the audience reaction.

We, on the other hand, see programs dozens—even hundreds—of times. How many of you out there can sing “Waltzing with Bears” or the words to “Great Treasure Hunt?” How many know what “found it, found it” means?

Because we are so familiar with our shows we can see and appreciate the educational value, the subtle humor, and the ability of the program to connect with our audiences.

Let me use my planetarium (which I know the best, of course) as an example. I disagreed with Steve’s assessment that *The Little Star That Could* could be run as effectively in traditional format. I ran *Little Star* with slides a number of years ago and although I like the program, it didn’t really hold the attention of lower elementary students. Part of this rested in our automation system and its limitations; the other was the apparent mismatch between content (on the surface, on an 8th grade level in Ohio) and the presentation (cartoon figures, not appropriate for upper levels).

Joanne Young at AVI sent me a demo version of the fulldome program to test on live audiences, and I was amazed at its transformation. Because the faces are moving and talking, they now hold the attention of the audience. I’ve been showing this program recently to second grade classes, and the teachers leave raving about it, saying it meets the Ohio second grade astronomy standards perfectly. That surprised me, but then I realized that the higher-level information about the stars is being presented—and retained—in a way that second graders can understand and that the planet information is just right for that level.

Sure, after the show some of the students still think that red is hot, but most of them tell me afterwards that red is cool (like cool Big Daddy) and that blue stars are the hottest. Woo hoo!

But that doesn’t mean that Steve is wrong that the program could play well in other planetariums without fulldome capability. Different is not wrong; it’s just different. We tend to forget that when it comes to opinion.

We’ve decided that Steve will continue the excellent job he’s started, but we’ll make sure that we follow the same format, including lots of details at the start (similar to the book reviews).

For this issue, we’ve added something that will always appear now with the reviews: multiple viewpoints. We’ll seek out planetariums that are running the program under review and solicit a couple of paragraphs about how it runs. (Unfortunately, I ran out of time and had to write the *Black Holes: The Other Side of Infinity* comments myself; I hope you don’t mind this editorial intrusion.)

What makes this such a difficult task, again, is the balancing act. Unlike most of the book reviews, we personally know and like the writers and producers, artists, musicians, animators, and myriad of others providing a commodity that we use limited budget funds to buy. We hate to say negative things about our friends, but the need to do so is a fact of

(Continued on page 49)
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We are the product of 4.5 billion years of fortuitous, slow biological evolution. There is no reason to think that the evolutionary process has stopped. Man is a transitional animal. He is not the climax of creation.

Carl Sagan
The Planetarium: A Transitional Animal

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With nearly 3,300 planetariums worldwide, such changes will take time to propagate and converge into stable, next-generation paradigms for future planetarium programming. By reviewing past trends in planetarium programming, emerging trends in fulldome theaters and anticipated technological advances, possible scenarios for future planetarium programming are discussed.

If history is to be a guide, the future of planetarium programming will be a natural extension of past and emerging trends in planetarium programming and related media. New technologies such as fulldome video can open doors for innovative changes that have already been brewing and are liberated by new digital capabilities and the fresh talent that they attract.

Historic Perspective

The modern projection-based planetarium, introduced in 1923 by Carl Zeiss Company, was intended to be a scientifically accurate diorama of the night sky. From the start, storytelling became an integral part of planetarium presentations, with lectures typically lasting 50 minutes.

Chicago's Adler planetarium was the first Zeiss planetarium in the U.S., opening in 1930, and was directed by retired Army Colonel and astronomer Dr. Phillip Fox. Upon seeing the first planetarium, he said “For years I have been a close student of astronomy and I did not realize it was possible to produce such a remarkable duplication of the heavens as I saw them in the operation of the planetarium at Jena. I lost all sense of being in an enclosure as the stars were projected on the great dome of the building.”

Creating the “sense of presence” that impressed Dr. Fox also drove the development of early panoramas, dioramas, motion picture film, large-format film, and most recently, virtual reality simulators.

Adler Planetarium in 1933

Dr. Fox saw great value in contemplating the heavens, remarking that “Children always are interested in the heavens; their minds are forever groping about them. In middle life people are occupied with their daily affairs. But old folk, again, turn to contemplation, and contemplation of the heavens; they have more leisure to think.”

His vision for the Adler Planetarium was to convey a sense of our place in an orderly and unified cosmos. He also hoped that the planetarium would unify humanity and “help to show that there should be no cleavage between individuals, nations, and races.” In justifying the planetarium, he said “People think that astronomy is a ‘useless science,’ but a planetarium is just as valuable to mankind as the art institute or the civic opera.”

Indeed, the early Zeiss planetariums were as costly as an art institute or civic opera to construct, often housed in large marble and concrete buildings complete with fountains, statues and large gardens.

As technology allows us to learn more about the universe, it also allows us to share these discoveries with the public. In this collage, Galaxy NGC 3021 serves as the backdrop of a new cosmic “distance ladder” technique to determine the Hubble constant. The new technique reduces the distance ladder to three “rungs”: (1) The distance to galaxy NGC 4258 is measured using straightforward geometry and Kepler’s laws; (2) Cepheids in six more distant galaxies are used to calibrate the luminosity of Type Ia supernovae; (3) The Hubble constant is measured by observing a brighter milepost marker, Type Ia supernovae, in more distant galaxies hundreds of millions of light-years away, embedded in the expanding universe. Credit: NASA, ESA, and A. Feild (STScI). Hand graphic: istockphoto.com


2 Menke
Planetariums were only to be found in the largest metropolitan areas, and were often named after their wealthy philanthropists—families like the Adlers, the Buhls, and the Haydens. They were objects of great curiosity that drew in many first-time visitors, but similar to the short-lived novelty of a world’s fair exhibit, one study showed that few returned for a repeat experience.  

Griffith Observatory in the 1940s

Perhaps the first departure from night-sky astronomy education came from Los Angeles’ Griffith Observatory in the 1940s. After World War II, Dr. Dinsmore Alter, director of the Griffith Observatory, pioneered a new type of planetarium experience. Believing that space travel was imminent—including a manned mission to the moon within the next 100 years—Griffith’s planetarium shows changed from an instructional series focused on the basic tenets of astronomy to a simulated moon mission called A Trip to the Moon. Dr. Alter simulated a rocket trip and moon landing using specially-constructed special effects projectors, including zooms and panoramas, that simulated the effect of approaching and landing on the moon.

A lecturer at Philadelphia’s Fels Planetarium, Armand Spitz, remarked that the planetarium was “the greatest teaching instrument ever invented,” and lamented at the high cost of the Zeiss instrument and its associated housing. Spitz’s subsequent introduction of the affordable Model A planetarium in 1946 marked a turning point in planetarium history.

After the Soviet Union’s launch of Sputnik in October of 1957, the “Space Race” brought recognition to the planetarium as a space education tool. President Eisenhower’s Advisory Council deemed the planetarium as one of six outstanding innovative educational projects during his term. By 1970 there were over 700 planetariums in the U.S., fueled by federal NDEA matching funds and Title III grants.

As planetariums became increasingly adopted by educational institutions, a new breed of planetarium-as-classroom emerged, and with it the need for well-defined and measurable “cognitive” educational goals beyond the “affective” goals (aesthetics, inspiring awe, satisfying curiosity, etc.).

Problem-solving activities were pioneered by the Lawrence Hall of Science in the 1970’s with Participatory Oriented Planetarium (POP) curricula. This hands-on approach was designed to make the planetarium experience more active, with seeing and hearing replaced by doing and talking.

While educational programming satisfied the goals of classroom planetariums, mid-sized and larger public institutions struggled to retain the interest of an increasingly sophisticated, media savvy audience saturated with films such as 2001: A Space Odyssey, Marooned, and Silent Running, and television shows such as Star Trek.

In 1974 Max Ary warned against the “MGM Syndrome,” a runaway effect created by attempting to outdo Hollywood productions with “tremendous, slam-bang” planetarium shows. He also warned against pure entertainment programming, reminding planetarians of Armand Spitz’s original vision of the planetarium instrument as an educational tool. The trend towards more visually rich programming in public planetariums has continued to this day, however, with successive developments in theater automation, special effects projection, and video. Larger domes are now facing a possible collision with large-format film as both planetarium projection and film projection move into the common realm of digital projection.

Alternative programming

Planetariums have also been innovators in alternative programming reaching beyond astronomy education. Planetariums have used their theaters and classrooms to tell stories, both modern and ancient, and to take visitors beyond the Earth to deep space and other worlds, both real and imagined.

While most stories retained an underlying astronomical theme or tie-in (i.e. the star of Bethlehem, constellation myths from ancient cultures, cats in space, etc.), the medium was routinely stretched far beyond the simple night sky, supplemented by slide projector dissolve-pairs, panoramas, all-sky projections, and numerous special effects projectors.

Some classic planetarium programs actually fall within the genre of science fiction. Others are dramatic stories that weave in concepts of astronomy and planetary science. Still others are special theatrical events celebrating music, holidays such as Halloween, or live concerts.

Starting in the 1970’s, many planetariums took visitors into “inner space” with beautiful abstract laser lightshows. The original laser lightshows were fine arts experiences set to classical music. It wasn’t long before more popular musical genres dominated including progressive rock, pop, and heavy metal.

This visual music art form—pioneered almost exclusively by planetariums—remains the most successful use of domed theaters in the modern arts. A unique form of entertainment enjoyed by millions was created by the bright, highly saturated colors of laser light animated by moving galvanometer-driven mirrors; formed into lumia patterns by special
Fulldome Programming Trends

It is natural to expect digital domes to carry on the legacy of planetarium storytelling—both factual and mythological or fictional—and culturally-relevant visual and musical arts programming. The range of programming trends presented here are indicative of future programming in this medium.

Of course, the “meat and potatoes” of planetarium programming is factual educational astronomy programming, especially programs featuring seasonal constellations, the sun and moon, and the solar system. Nearly all fulldome systems currently offer real-time databases that include accurately rendered local 3D stars, the Earth with increasing levels of detail and data layers (think “Google Map” on a dome), orbiting man-made satellites and the moon, our full solar system with accurately placed and textured moons and major asteroids, the galactic plane, local galaxies, distant quasars and more.

Rather than finding one’s way across the celestial sphere from Orion’s belt to Sirius, digital planetarians are navigating their way through 3D space—flying past Sirius, turning right at the Pleiades, swinging by the Orion Nebula and exiting the galactic plane. Increasingly, new datasets, unique ways of presenting multidimensional data, and powerful visualizations based on accurate astrophysical simulations are extending our intuitive grasp on the origins, nature and destiny of the universe as well as our place within it.

Loch Ness Productions, long the staple of educational planetarium programming, has embraced the fulldome medium with a wide range of time-honored planetarium programs, including a set of seasonal “green arrow” night sky star talks called Seasonal Stargazing, plus a host of new and updated classic planetarium programs, including Hubble Vision 2, Larry Cat in Space, MarsQuest and, most recently, Light fantasy drama Secret of the Cardboard Rocket, and Rensselaer’s animated thrill ride into the world of atoms and molecules, Molecularium: Riding Snowflakes. Whether storytelling drama or more traditional science documentary, future planetarium programming will access advanced scientific simulations, and illustrate scientific concepts in ways that are increasingly entertaining, exciting, and awe inspiring.

Tilt Design Studios in Kiel released a unique non-astronomy fulldome program called Alien Action (www.alien-action.com). The fulldome program was produced by Dominic Bünning and Ralph Heinsohn, and includes music by the band Munit (www.munit.org) and an interactive game segment designed by Markus Schack from the Kiel Mediendom. The show is something in between music show, sci-fi story and pop art with a high approach to its design that targets the “iPod generation” with an interpretation of the “alien invasion” theme.

Visual music makes a comeback

The visual music genre is also making a

...
comeback in digital domes, including the American Museum of Natural History's Sonic Vision. The creative director, Chris Harvey, assembled a host of artists and animators to create the 38-minute program that has been syndicated to 5 U.S. planetariums. The eclectic music track was mixed by popular artist Moby and includes his music as well as that of The Prodigy, David Bowie, and Radiohead. The visuals include cosmic, mystical, mandal-ic and other-world imagery.

Salt Lake City's new Clarke Planetarium, lead by Programs Manager Mike Murray, has pioneered a series of live fulldome programs, including a classic rock mix called Rock on Demand, which has played at three other theaters.

They also run Dark Side featuring Pink Floyd, produced by Starlight Productions. Audience members can actually create their own playlist by voting for which songs they want. Weekend attendance has been excellent with a consistent 50-90% capacity.

Shows are enhanced with real-time effects performed live by the show presenter, utilizing two joysticks and dials to manipulate a diversity of abstract objects and textures. They have also experimented with live performances in the dome and hope to do more in the future.

Germany's Mediendom in Kiel has produced numerous programs and performances featuring diverse artists such as Céline Dion, Fury in the Slaughterhouse, and of course, Pink Floyd.

Also at Kiel, Prof. Tom Duscher of Germany's Muthesius College of Art produced a live interactive fulldome dance performance called ICH² (meaning “me” to the power of two) incorporating motion tracking, live video capture, and real-time computer graphics (www.ich-quadrat.de/eng). They are seeking to tour this program internationally.

Interactive performances featuring unique controllers promise to extend the VJ (video jockey) into IJ (immersive jockey). Elumenati currently offers VJ software for single-lens fisheye projection, and have supported a number of live events. Obscura Digital produced a touring dome show including live VJ and DJ performance.

And, in perhaps the ultimate real-time art performance, Sky-Skan debuted artist J. Walt's 3D stereoscopic VJ virtual world performance on a stereoscopic fulldome system at DomeFest 2007. Dubbed Spontaneous Fantasia, Walt uses a digital tablet and 6-D joystick to first build a virtual world, then navigate a fancy “dragon” through the environment, all the while controlling both the dragon flight and the virtual camera view.

SciArt emerging

The emerging genre of SciArt (also called ArtScience)-featuring collaborations between scientists and artists-is a natural direction for the future planetarium. One such example is Bella Gaia, which started as a collaboration between producer, composer and classically-trained violinist Kenji Williams and astrophysicist Dr. Ka Chun Yu of Denver's Gates Planetarium. Bella Gaia represents a new wave in live cultural programming under the dome.
Kenji says “People have a greater understanding of the wholeness of our planet after viewing it from space, without borders, race, or religion. The motivation and impetus behind everything I do is always making media that raises consciousness.” The debut show in Denver sold out all 4 performances, and post-show surveys indicated a high level of visitor satisfaction.

Kenji has since teamed with Carter Emmart for astrovizualization and has performed Bella Gaia at IPS 2008 in Chicago, the International Astronautical Congress in Glasgow, Yuri’s Night at NASA Ames, and the Smithsonian Folklife Festival for NASA’s Galaxy Stage. He is now booking a worldwide tour of planetariums and HD theaters for 2009/2010.

Another successful SciArt program is First Friday Fractals, an hour-long program presented twice monthly at LodeStar Planetarium in Albuquerque, New Mexico. This live program, produced in cooperation with Jonathan Wolfe, executive director of the Fractal Foundation (www.FractalFoundation.org), begins with a lecture format consisting of examples of naturally-occurring fractal patterns, such as trees, mountains, rivers, seashells, and galaxies, and illustrates how the basic process of repeating a simple algebraic equation generates these stunning patterns.

The other half of the show presents mathematically-generated fractal animations that zoom the audience deep into these infinitely complex objects, backed by a compelling musical track. First Friday Fractals has been so successful that it will soon be launched as a weekly program, and there are plans to package it as an automated fulldome production to make available to other facilities. Since the program began it has sold out all 23 consecutive shows, with about 3500 people having seen it, and hundreds more turned away—completely unheard of for a math/science educational show!

MetaVista is a recent SciArt collaboration with guitarist Jens Fischer and Keil Medien- dom engineer Bastian Barton, creating a fusion of contemplative music and sensual images of nature and astronomy. Jens Fischer plays the acoustic guitar and simultaneously accompanies himself using a loop sampler. A strong interaction between music and realtime generated images combined and triggered by pre-defined buttons.

Contemporary artists have been discovering the dome as well. Gronk’s BrainFlame is a 15-minute fulldome art animation created through the Digital Arts Project, an educational outreach program at the University of New Mexico’s Arts Technology Center. Created by Hue Walker and a group of animation students over a two year period, the piece is based on a story line provided by world renowned Chicano artist Gronk, and is populated with elements drawn from his visual journals and paintings.

BrainFlame takes the viewer along on a creative journey into an artist’s mind developing a creative spark into a work of art. The animation premiered at LodeStar Astronomy Center in 2005, the same year it was featured at Siggraph at the fulldome exhibit and art gallery animation theater. BrainFlame continues to be shown in fulldome theaters throughout the world as well as in a 4-minute “framed” version which has been screened at several art animation festivals.

Theater design follows suit

Innovations in planetarium programming have also extended into the theater design. The Science Center of Iowa in Des Moines opened in May of 2005 with a 15.2-m Spitz dome featuring a 10 degree tilt, an E&S Digistar 3 system, and no seats—at least no fixed seats. The front half of the theater is open floor space, and the back half has three 14 inch round tables are placed on the open floor, and 2-person bistro tables on the tiers for larger groups. Guests dine with the Earth limb on the horizon, the stars and moon, and a real time animation of the ISS. For desert the science center offers a tour of the Grand Canyon, images of local fall foliage, and selections. These events generate revenue for the theater which otherwise does not charge admission.

The Fels Planetarium at Philadelphia’s Franklin Institute has removable seats under a level dome and also rents the space out for banquets and special events.

Future Directions


At IPS 2008, E&S introduced large-format films from K2 Communications that have been digitized and converted to dome format. Some have expressed concerns with this trend, not wanting the dome to become just another cinema, large-screen TV or IMAX theater. Others welcome the diversity of programming and feel that it adds value to the digital theater. In the future, large-format digital cinema will be a subset of digital dome capabilities which, unlike film, will serve as portals into the world of imagination and electronic information.

Music has long been known to be a powerful mood-altering agent. Visual music experiences of the future will likely encompass a wide spectrum of moods and styles. Some planetariums have been running Meditainment (www.meditainment.com), a program by UK media pioneers that is expressly designed to provide a relaxing, restorative expe-
venience. As we all know, when the lights go out and the seats tilt back we sometimes loose visitors to slumber. In these stressful times this becomes a meaningful service.

The intentional use of media to invoke various moods—a sense of awe, excitement, relaxation or contemplation—is itself a science, is the basis for my cable television project Harmony Channel (www.harmonychannel.com).

Perhaps video game design and real-time interactivity have the greatest potential to transform the planetarium into an entirely new medium. Generation Y (that is, post generation X’ers born from 1983 to the present) is growing up in an interactive computer age and will likely demand a more hands-on, collaborative, personalized experience that uses the full power of the digital dome, including remote telepresence, web-based pre-event and post-event interactivity, networked dome presentations and competitions, and personalization of the visitor experience.

While early real-time programming featured audience-interactive programming (particularly from Goto and E&S), recent years have seen a greater focus on pre-rendered and more recently, live-action production techniques. Real-time programming has been largely confined to operator navigation of astronomical databases.

The technology is here today to deliver these experiences, including a growing database of the known universe, natural phenomena, and near-photorealistic rendering capability. What seems to be missing is the “killer app,” a compelling, robust real-time application that allows effective audience participation.

One real-time application that could deeply engage audiences while remaining true to science-center imperatives is VirtuePlay’s Lunar Racing Championship. LRC is a fast-paced buggy race on the moon that is well-suited to a tournament-like application. The audience can obstruct the players using a variety of means. Simple button boxes allow the audience to create fog banks, lightning bolts, earthquakes, etc. The theater will be divided into two Zeus characters, each steering the audience’s global view towards areas of interest on the playing field using a 3D controller.

Audience interactivity can be included in the form of a “Zeus mode,” wherein the audience can obstruct the players using a variety of means. Simple button boxes allow the audience to create fog banks, lightning bolts, earthquakes, etc. The theater will be divided into two Zeus characters, each one able to obstruct the opposing team.

The planetarium of the future will be defined not just by technology or genres, but also by the range of programming topics presented driven by public demand and shifting institutional goals.

Based on global cultural trends, I foresee future planetarium programming providing a fresh and unique fusion of science, art, environment, future technology, music, creativity and consciousness. While some of these will push the envelope for institutional missions (such as future technology or topics involving consciousness), planetariums will avoid documentary programming that is not clearly aligned with scientific principles.

Yet speculation, imagination, intuition and the mysterious lie at the leading edge of science, and need not be excluded from planetarium programming per se. It is the confusion of speculation with testable hypotheses and validated scientific theories that gets the ire of scientists. Failure to differentiate between the two falls into the realm of pathological science or pseudoscience.

There are many controversial topics of great interest to the public that fall into the unknown, unknowable, or untestable category and are not accessible to science. Questions such as “where did we come from,” “why are we here,” and “where are we going” arise naturally when discussing our cosmology - a topic that falls squarely within the domain of the planetarium.” Giving pat answers to these questions denies their inherent mystery and smacks of scientism, fueling public distrust of science.

With the rising interest and research in consciousness and intuitive modalities that emphasize inner experience (affective thoughts, feelings, intuition and beliefs) as a valid domain of phenomenology (and one that is integral to our well being), planetariums of the future will likely touch upon deeper metaphysical issues that have plagued philosophers for millennia while remaining firmly grounded in scientific rigor.

This is possible through clearly differenti-

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At the same time that a great number of business organizations all over the globe cease to operate because of the world economic crisis, scientific and educational establishments also face this most difficult problem: the problem of survival.

On November 4, 2009 the St. Petersburg Planetarium will celebrate its 50th anniversary. A secret of the longevity of our educational institution, allowing us to live through the most unfavorable times, is not just a good luck or sponsor’s aid, but a precisely crafted and tested operating conception that we are happy to share with readers of the Planetarian.

The first and most important in the art of survival in the times of economic cataclysm is preserving the reputation of an establishment. This is particularly important for educational institutions. When the temptation to turn education into revenue-increasing entertainment shows is great, we need to remember that the most important mission of the planetarium is to enable people to look into the world of astronomy knowledge and to widen their outlook to ponder about the eternal questions of the universe.

Following the main goal—education—the St. Petersburg Planetarium has been answering the eternal questions of St. Petersburg residents and guests of the city during the last half century.

Our planetarium is an integral part of the social organization Znanie (“knowledge”) society of the St. Petersburg and Leningrad area. It was established in 1947 on the initiative of a group of prominent Russian scientists. The Znanie today is a non-governmental public organization uniting the most active parts of Russian intelligentsia. The main task of Znanie successfully accomplished by the St. Petersburg Planetarium was formulated by the outstanding Russian physicist, academician and President of the Academy of Sciences of the USSR Sergey Vavilov: “Our society must be a conductor and intermediator of true advanced scientific knowledge from specialists to the people.”

The importance of people

The second—but no less important—factor that allows survival is the proper choice of a team. The right people are needed to share knowledge with the guests of the planetarium. The distinctive feature of St. Petersburg Planetarium is that each group of visitors is met by a lecturer who is a highly-skilled specialist, but who also is the very important “living being” who will answer all the questions and adapt his information to the level of visitors’ knowledge and interests. Knowledge is passed directly from the lecturer to his listeners. This type of dissemination is all the more important in today’s world where computer technologies easily replace the work of hundreds of people.

Although a recorded program can be watched a few times, it never varies. The same lecture in our planetarium can be visited infinitely because each lecturer makes it in his own way and improves and develops his program.

The best idea or people cannot compensate for bad organization of the whole institution. Our planetarium developed a system of sharing knowledge and experience that takes three basic forms: popular scientific lectures, educational courses, and field educational lectures.

Lectures in the main Star Hall, 15 meters high and 25 meters in diameter, are aimed to present a certain astronomy theme from general information up to a very specific knowledge of the universe. Guests of the planetarium can choose a subject on their own in accordance with their preferences. Over six hundred programs have been developed and constantly perfected for this purpose.

The planetarium’s major audience is pupils of all ages. It offers to schools of the city and
region courses in astronomy, nature, and history. These courses include visits to the planetarium all year round.

The educational cycle allows the students not only to obtain systematic knowledge, but also to enlarge it with the help of unique visual material and modern projection techniques.

There are also field lectures for schools, high schools, and military educational institutions which, for some reason, are not able to visit the planetarium.

Besides the main Star Hall, several more halls also are popular, each of them corresponding to the basic mission of our museum. They are:

- A laboratory of entertaining experiments in which a Foucault pendulum is situated, the only one in North-West Russia. In this hall our guests become participants of enthralling experiments in which they can see and prove for themselves basic physical phenomena.

- The planetarium observatory, equipped with the most up-to-date telescopes—currently a Meade LX 200 and a Coronado—that enable first-hand observations of distant stars and galaxies. It is worth mentioning the fact that the first Russian observatory appeared in St. Petersburg. Citizens of St. Petersburg often do not have the opportunity to admire celestial objects due to climatic conditions, but they are still enthusiastic and always want to see them with their own eyes.

- A hall named Planetka (“small planet”) gives listeners all the spectrum of geographical disciplines, offering a fascinating trip to different countries and continents.

- The Cosmic Trip Hall, as its name suggests, is a virtual flight through space and allows visitors to become a member of a spaceship crew. Unlike modern entertainment-only complexes, our space trip acquaints participants with real scientific knowledge needed during a space flight.

At present the St. Petersburg Planetarium is a unique scientific educational institution with 50 years experience of survival in a world where entertainment is becoming more and more popular. In spite of the economic crisis, we will always be there to fill the need for education and the search for knowledge.

The faces of Znanie at St. Petersburg start with the building’s welcoming exterior (facing page) and its entrance foyer (top right). The impressive Zeiss greets visitors in the Star Hall, while the real stars greet eager viewers in the observatory (when the weather cooperates). Experiments and a Foucault pendulum are housed in the lab. One sight visitors won’t see is IPS Past President Martin George, who visited in 2007. All photos from St. Petersburg Planetarium.
Elmo and Big Bird live in the United States and Hu Hu Zhu lives far away in China, but they discovered that they still see the same stars at night! The word for star in Chinese is “xing xing” (pronounced sing sing). How many “xing xing” do you see in this sky?

Produced by Sesame Workshop, the Beijing Planetarium, Chicago’s Adler Planetarium, and Liberty Science Center with major funding provided by the National Science Foundation. Suitable for ages 4 and above. Approximate running time 27 minutes. Available in English, Spanish, and Mandarin.

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see Tycho play in zero gravity, witness Earth from space, and watch meteors shoot across the night sky. Includes the much-loved singalong song “Don’t Touch!”

Produced by Museum Victoria. Running time 21 minutes. Suitable for ages 7 to 10. Tycho merchandise available.
When I arrived as a new physics faculty member at Radford University in the far southwestern corner of Virginia, I was surprised to find that there was a planetarium in our department. It was a small place, with a 24-ft dome and 32 fixed moderately-comfortable seats. The dome was painted a light eggshell color; unfortunately, the walls were the same color. And while the carpet was nice and soft with a thick pad underneath, its light tan color did nothing to help darken the place.

I was told that it had not really been used in its 25+ years of existence for fear of it breaking down. That puzzled me, since I could see the GOTO G-8 projector was completely analog and I saw they had a large cache of extra bulbs. Since I was the only faculty member now with a background at least related to astronomy, I began to play with it to see how it worked.

I began to use it with my introductory astronomy class my first semester. I also began to receive a few scattered calls from local Scout groups asking for my help in obtaining various astronomy-related badges. I quickly became fond of the place, but still, over the next few years, it only received sporadic use.

In the late spring of 1999 something happened to add some urgency to the expanding use of the place. Other science departments in our building were looking at the planetarium for their own physical space needs. That led me to start looking around for anything that might increase its use.

In the late spring of 1999 something happened to add some urgency to the expanding use of the place. Other science departments in our building were looking at the planetarium for their own physical space needs. That led me to start looking around for anything that might increase its use.

I finally found something online from the Bishop Museum Planetarium in Hawaii. They were advertising a series of shows whose production was funded by NASA. One of the funding requirements was that they had to give away copies of this show to interested planetariums. I contacted them and they found what appeared to be the final copy of their excellent show *The Explorers*.

I knew that I had to find a way to present the show and thus I scrambled to find an unused slide projector (remember, this was 1999). I quickly placed it on the star projector control panel, where it could at least show something on the dome. The early 70s sound system—complete with reel-to-reel tape deck—didn’t work, so I snagged an extra set of nice computer speakers with a subwoofer. I used a laptop computer to play the CD soundtrack. I found a videodisk player and hooked that up to an old LCD panel that sat on top of an overhead projector. I could move the slides along while the CD played, and I could hit “play” and “pause” on the makeshift video projector as the script directed.

I had my first “show” in October of 1999 for my department members, who charitably showed up to see this novelty. Our Department of Chemistry and Physics only had two physicists—the other seven faculty members were chemists. Audience members also included our secretary and my in-laws! Not a great start, but it was something. I contacted local schools and got the local edition of a regional newspaper to advertise free shows two evenings a month. By the end of that calendar year approximately 170 people came for the show, including two local middle school groups taking a short field trip.

I was surprised at the interest in the planetarium that quickly built. In 2000, the number of visitors swelled to nearly 1,800. This number included an expanding number of school groups coming for a star tour and to see the educationally-valuable *Explorers* show. In the summer of 2000 I obtained our first commercial show, *’Tis the Season*, from Loch Ness Productions. I started showing this just prior to Thanksgiving. This proved so popular that I had to add more shows to the schedule as Christmas drew near.

Due to the popularity of the place I was able to obtain more surplus/underused equipment from the university. I eventually jury-rigged 4 projectors around the periphery of the planetarium so that I could use three of them for a panorama setup. The fourth projector pointed above them and showed the other slides in each show.

Over the years the number of school groups increased. On occasion I could add to their experiences, thanks to a chemist in our department. Dr. Francis Webster had, at the same time, begun developing a chemistry show that appeared to be “chemistry magic” but that he used to explain various chemistry concepts. At times I also could get a geologist in our building to show these groups some things related to that field.

Eventually over 2,000 people per year were visiting, with hundreds of those being school groups. In early 2005 I formed the Radford University Science Alliance to give this a more formal setup. Our group of varied scientists had educational outreach as our goal. The hour-long planetarium shows formed the foundation of the visit, with other activities in 30-minute blocks. Our department’s secretary, Mary Gilmore, and I worked a rotation schedule in which

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Greetings from a very damp Northern Ireland, although in the past month I have been in sunnier climates in the USA en route to and from my eldest daughter’s wedding in New Zealand, as well as in Alexandria and Cairo attending a planning meeting for the IPS 2010 conference. So I have seen a lot of sunshine by travelling half way round the planet and back. Confidently, I must tell you that being the father of the bride is not all that it is cracked up to be: the upside is that the ocean around New Zealand is a good place to catch snapper. Excellent eating!

I want to take this opportunity to let you know that there have been some very big changes in the organisation of the Indian planetarians. I was privileged to be invited to attend their annual meeting in Goa at the beginning of this year. We had a great time, sponsored by the local company Information Technologies. I thank the two primary organisers, Abhijit and Gandhali Shetye, for all of the hard work which they put into the meeting, and of course all of the local Indian planetarians who assembled for the conference. It is really encouraging to see the energy and commitment that was evident in all of the participants.

I and the other officers anticipate that there will be a rejuvenation of activity in the Indian planetarium community, as it is right that the world’s largest democracy has a voice at IPS meetings. It was also very gratifying to talk to the people from the Indian planetarium community who attended the Goa meeting and to hear from them that the problems that we encounter are global, even if the solutions have to be tailored to account for local cultural and educational differences. The philosophy of spreading knowledge and information remains constant. So I hope that in the near future we can welcome our newly organised colleagues from India to our meetings and conferences so that you can meet with them yourselves.

Another excellent development is the news from Brazil that they are planning to build a new Rio de Janeiro planetarium at Niteroi to serve the large population who live there. It seems to me that the local educational authorities there are taking the long view, and this can only benefit the Brazilian nation as this will surely encourage lots of their youngsters to become scientists and follow technical careers. My congratulations to my friend Alexandre Cherman, who has been appointed as the new director of this facility.

I would like to commend to you all of the people who have been involved in the production of new shows for the IYA 09. I have just received Armagh Planetarium’s copy of the Two Small Pieces of Glass show which has been provided by our treasurer, Shawn Laatsch from Imiloa in Hawaii. We are awaiting delivery of the new We Are Astronomers show from the team at Leicester, scheduled to open in UK planetariums during May. Another new show has been made by the European Space Agency and will be available soon.

You all can obtain copies of Two Small Pieces of Glass as it is being distributed free to IPS members. You only need to pay for the media on which it will be shipped to you. So if you have not ordered your copy yet, do so; it is a great opportunity to spread the astronomy message that we have a really cool subject to talk about and that the limits are inside your head: where do you place the boundaries of your imagination?

The Library of Alexandria

I would like to tell you about visiting the Bibliotheca Alexandrina (Ba: the Library of Alexandria) and its affiliated Planetarium Science Centre, managed by the Director Hoda Elmikaty and her colleague Dr Omar Fikry. As usual, the hospitality of my Egyptian friends was first rate, and I thank them whole heartedly. At the beginning of May I attended a meeting at the Library to take part in the planning for next year’s IPS conference, the theme of which is “Back to Alexandria, the cradle of Astronomy,” and I can assure you that it will be an event to remember.

The meeting spaces are spectacular, the venue is world class, and everything will be accommodated under one roof, so your job will be to travel from your hotel to the venue and all will take place there. We are working on some innovative solutions to the perennial difficulty of seating large numbers of us at one time, but the venue has a fine selection of first class auditoriums and display spaces for the vendors.

The city of Alexandria is a fascinating mix of old and new juxtaposed with traditional and ultra modern and is the meeting place of many cultures, religions and languages. The mixture of Pharaonic, Coptic, Arab, Greek, Egyptian, Roman and many other influences is staggering.

From my discussions with people attending the first conference dedicated to science centres in the Arab world in Alexandria in November last year, I am persuaded that in the Arabic-speaking world there is a groundswell of interest in establishing a collaborative network of science centres, including planetariums, across the southern littoral of the Mediterranean, which encompasses all of the countries from Morocco to the Arabian Gulf, and including Lebanon, Syria, Iran and Iraq.

Exploring battlefields

While I was in Alexandria I had a free afternoon and took the opportunity to make a pilgrimage to the WWII battlefield of El Alamein, west of Alexandria and the Nile delta. Like Stalingrad and Midway, this battle was one of the turning points of the war. The Allied troops involved came from all over the British Empire to face their Axis opponents from the Italian Empire and the German Reich. The battle was one of attrition, and was hard fought. The human cost now is found in the well-tended graves of the different combatants.

At the Allied cemetery I found it incredibly moving to read the names of all of the young men from Australia, South Africa, and New Zealand, as well as from all over the UK and Ireland, India, Poland, Greece and France. Most of those who died in this battle were in their late teens and early twenties. The Axis soldiers were equally young and they also lie at rest in very peaceful and dignified sites nearby.

The measure of the Allied success in defeating tyranny is evident all around the

(Continues on page 30)
I spent the first part of April—including the 100 hours of astronomy—in the northwest corner of Tanzania, just south of the equator. In spite of being the rainy season, we got one clear evening, so I could present some stars and constellations to a small but interested group of Tanzanians. The bright moon outshone the Milky Way, but Orion was laying on his stomach (which he never does in Sweden) and the Southern Cross pointed so nicely towards the southern celestial pole—this constellation is never seen at home on latitude 60° north.

The International News column is dependent on contributions from IPS Affiliate Associations all over the world. Many thanks to Agnès Acker, Vadim Belov, Gail Chaid, Alexandre Cherman, Kevin Conod, Alex Delivorias, Alan Dyer, Martin George, John Hare, Natalya Kovalenko, Shaaron Leverment, Ad Los, and Loris Ramponi, for your contributions.

Upcoming deadlines are 1 July for Planetarian 3/2009 and 1 October for 4/2009. Anyone who wants to contribute news from parts of the world where IPS has no Association (see page 3) is welcome to send it to Martin George, martingeorge3@hotmail.com.

**Association of Brazilian Planetariums**

Brazil has gone digital! In a happy coincidence, the first two Brazilian digital planetariums have opened to the public in December 2008. One is in Rio de Janeiro, belonging to the Rio de Janeiro Planetarium Foundation (which has three domes now) and the other in Feira de Santana, in the state of Bahia.

The first digital Brazilian planetarium opened earlier in 2008, at Escola Naval (the Brazilian Navy Academy), also in Rio. It is not open to the general public, serving only the students at the academy. It is a Digitalis projection system, hosted in a 6-m dome.

The Rio de Janeiro planetarium has a 12-m, 88 seat dome, with a Digistar 3 projection system. The Feira de Santana planetarium has a Zeiss projection system. Early in 2009, Zeiss opened another digital planetarium in Aracaju, capital city of the state of Sergipe, in the Northeast of Brazil.

On a similar note, a new planetarium has opened in Parnamirim, also in the Northeast region of Brazil. It has a 60-seat, 8-m dome and it hosts a Sphaera ST6, built by Sphaera Planetarium, the only medium and large planetarium company in Brazil.

**Association of Dutch-Speaking Planetariums**

With the words “the Eagle has landed,” Neil Armstrong confirmed that it was done, the first manned landing on the moon on 20 July 1969. This year 2009, the 40th anniversary of that great event, will get some extra attention in The Netherlands by the Planetarium Rotterdam.

For that occasion a spaceship simulator was built at the site of the planetarium, which is located in Ridderkerk, a suburb of Rotterdam.

In the simulator, the sensation of motion is generated not only by 3D images and Dolby surround sound, but also motion of the complete projection cabin is incorporated. By this motion, an extra dimension is added, since it is not only the images creating the sensation of motion, but also real forces of acceleration and deceleration as well as vibrations and landing shocks contribute to a real experience.

From Ridderkerk the spacecraft will be launched with a maximum of 8 passengers on board, and after a partial Earth orbit the trip to the moon begins. At landing on the moon the American visitors, Armstrong and Aldrin, will be observed during their mission on the lunar surface.

The Dutch spacecraft will leave the moon for the trip back to Ridderkerk, where it will land on the same location after a re-entry into the Earth’s atmosphere. The simulator Moon experience was added to the planetarium program on 1 May 2009. The hardware was built by the staff of the planetarium, and the images and the software were developed by Mirage 3D in Den Haag.
Association of French-Speaking Planetariums

Planetariums were especially active during the 100 Hours of Astronomy (2-5 April), when bad weather prevented sky observations. They also were as a necessary complement to the observations, because audiences wished to know the configuration of the constellations before observing and to understand the properties of the stars, nebulae, and galaxies observed.

A new chair for disabled amateur astronomers was presented on 17 December by Jean-François Soulier, in the framework of an IYA 2009 meeting held at the Paris Observatory. Two copies of this chair were available for the 100 Hours of Astronomy in the Paris vicinity.

For the IYA, 10 planetariums celebrated the spring equinox with their public, presenting animations and shows for young and family audiences.

Association of Italian Planetaria

The statement of the new national Association of Italian Planetaria (PLANIT) was given on 20 March during the International Year of Astronomy in Florence, when an important exhibition about Galileo Galilei opened. In April, the City of Science in Naples hosted the 24th National Conference of Italian Planetarium.

The Planetarium of Rome took part in the Science Festival 2009, The Universe, as co-producer of the event. This was the first public event in the city of Rome to celebrate the International Year of Astronomy. The Festival took place at the Auditorium Parco della Musica 15-18 January, featuring a remarkable list of events in terms of quality and quantity. The Festival was widely acclaimed by the public, and recorded an increase of 35% in the number of visitors compared to previous years. The Planetarium of Rome gave a sizeable contribution to this success. Four of the main events were created by the planetarium for the Festival:

- On 15 January, the dome of the planetarium in the Eur district of Rome was the stage for Stellar Vibrations, a concert of original electronic music by Angelina Yershova produced in collaboration with Simone Papalardo, and with astronomical setting and planetarium programming by Stefano Giovanardi. The event was sold out.
- On 16 January, the Teatro Studio of the Auditorium hosted a roundtable on the “Utopic and Anti-utopic Visions about Mars,” introduced by Vincenzo Vomero and with guests Marcello Coradini, ESA; science fiction author Tommaso Pincio; and science journalist Sylvie Coyaud as chair.
- On 17 January, the large Petrassi Hall Auditorium with 700 seats was sold out for the show-lecture The Shape of the Stars, an overview of the representation of stars in paintings from the Neolithic to Futurism and the influence of science on art, produced by the planetarium staff Gabriele Catanzaro, Giangiocomo Gandolfi, Stefano Giovanardi and Gianluca Masi, with the participation of pianist Giovanni Renzo and presented by Vincenzo Vomero.
- Following the show, Ruggero Pierantoni from University of Toronto lectured on star-shaped cities in his lectio magistralis As in Heaven like on Earth. The evening continued with a session of stargazing by the naked eye and with telescopes, guided by the team of scientific explainers from the planetarium.
- On 18 January the planetarium hosted the first Festival of the Universe for Children, created by Gabriele Catanzaro: one day full of astronomical shows, guided tours to the Astronomical Museum by a team of scientific explainers from the planetarium, workshops, and micro-lectures by popular authors as Mario Tozzi and Ettore Perozzi. Special features of the festival were the shows by Doctor Stellarium (a cartoon scientist created by Gabriele Catanzaro) and his web-radio. More than 2,000 people flooded the planetarium and Astronomical Museum led by their children.

Besides these activities, the participation of the Planetarium of Rome in the Science Festival saw the première of the new Mobile Planetarium that was set up for the entire duration of the festival at the entrance gate of the auditorium and offered a rich calendar of shows: every half hour with two titles, Open Sky and Toward the Southern Sky; performed by the scientific explainers of the planetarium. About 2000 visitors attended the shows in four days, but long lines of people waiting to get in gave an idea of how much interest the Mobile Planetarium raised among the public.

Similarly assaulted by the crowd, the inter-
The Best Gets Better

Since its introduction in the summer of 2002, the GOTO CHRONOS rapidly became America's fastest-selling new opto-mechanical planetarium projector. Its extremely accurate and fast digitally-driven sun, moon, and planet projectors and its beautiful skies made it the number one choice for new construction as well as for refurbishing projects. Planetarians fell in love with the ergonomically designed control console and the effortless live programming it supported so well. And to top it off, not long after GOTO INC developed the world's first HYBRID planetarium in 2004, the CHRONOS was also "hybridized." What could be better?...

Times Change

The planetarium environment has changed somewhat since 2002. Fulldome video, developed and shown publicly first by GOTO in 1996, has matured to the point where many of the visualizations previously done with slides, film, and special effects projectors can now be done with digital video. And more producers are gaining skill in creating movies for this new medium. But there is still a need for a planetarium projection system that can be operated live by an educator in real time, without requiring pre-scripting. Planetarians still need the tools to create their own programs which fulfill the needs of their audiences, and to react to new celestial events quickly, or to answer questions immediately. So for many users, fulldome is not enough.

It's brighter!

A totally new star plate technique, paired with state of the art LED technology yields star images that are exactly the same size as the previous CHRONOS' tiny stars, but are five (5) times brighter! That means the CHRONOS II is now great for domes from 24-50 feet in diameter, and it shows up great with video!

CHRONOS II

The Best Gets Better

See a sample of the new LED CHRONOS II sky at Planetarium Conferences:

✦ MAPS : May 13-16 in Lanham-Seabrook, MD
✦ SEPA-WAC: June 16-20 in Nashville, TN

Call for more information.

It's green!

Well no, it's still purple, but the CHRONOS II is the world's first full-featured planetarium projector to be 100% illuminated by energy-efficient, extremely long-life light emitting diodes! This means the CHRONOS II consumes about 1/3 the power of the previous CHRONOS. Other benefits of the LED technology are that it runs cooler, thus requiring fewer and quieter cooling fans, and that users can expect at least 10,000-30,000 hours before the LEDs need easy replacement.

It can have a 'real' Milky Way

Besides the standard, independently dimmable, diffuse Milky Way of the original CHRONOS, users can now choose an optional very high-res Milky Way. Imagine 10,000,000 tiny "micro-stars" painting a subtle, very real Milky Way across the dome. Bring your binoculars!

It can cost less!

The CHRONOS II was born to be a HYBRID. This means that the "base model" CHRONOS II concentrates its efforts on extreme accuracy and speed of motions, the ultimate in ease and depth of manual, live control, and a perfect recreation of a pure night sky - but nothing else. The GOTO CHRONOS II HYBRID Planetarium™ system utilizes the power of Digistar to complement the strengths of the opto-mechanical projector, all under the control of a console that puts tremendous versatility at the operator's fingertips.

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Contact: Ken Miller
active stations of the Astronomical Museum and the Solar System Simulator became the tools used by the team of scientific explainers to lead the visitors through virtual tours of the universe and astronomical games. Finally, the Virtual Telescope by Gianluca Masi attracted thousands of people, with non-stop performances of remote observing and demos of online telescope control.

A. Volta Technical Institute/I. Danti Planetarium realized a project with some nursery school children teachers: Good morning star shine. It is a sensorial journey through the sky leading the children to the perception of the environment around them. The projection is conducted in order to create a significant experience in the time (light in the day and darkness in the night), in the color of the sky, and in space (near and far).

British Association of Planetariums

Across the UK, the wave of 360° full dome digital projection is breaking and there will soon be 13 fixed digital planetariums and 12 mobile digital domes. The affordable mirror projection system is the main reason for this recent change as well as the current use of domes in ways that make them “more than just a planetarium.”

With this in mind, institutes such as NSC Creative are working on making their show library available for portable systems and BAP planetariums were looking forward to seeing the comparison at the AGM in May. BAP will also get a sneak preview at NSC Creative’s new fulldome show We Are Astronomers, which was released to the public on 23 May 2009 (www.weareastronomers.com).

Thinktank has just launched a new science-art collaboration called Data Sea, a creation by Michael Takeo Magruder, funded by Arts Council England and supported by King’s College London. Using the planetarium’s fulldome environment and areas of the space gallery, visitors interact with the “digital sculpture” in real-time as they navigate through a virtual world based upon the Earth’s radio sphere. Created each day from live BBC broadcasts, the artwork shows how our communications travel through the Universe. The work is also available online at www.thinktank.ac.

Let us not forget Darwin’s 200th anniversary! UK planetarium shows are being adapted or created in order to combine astronomy with celebration of Darwin’s ideas. For example, Thinktank and the Centre for Life have produced a joint digital planetarium show called Voyage of the Beagle, which traces the stellar journey under southern skies of Darwin’s famous ship. Whereas some domes push for audience interactivity, Centre for Life sticks to “doing what domes do best” and uses the planetarium to its full advantage in this 20-minute feast of a show.

Finally, the big news from the UK of interest is the IPS is Ray Worthy’s retirement from the planetarium business. Starting out as a standard mobile dome teaching unit, Stargazer Planetariums grew into making custom-built inflatable domes and Ray is well known both professionally and personally to so many people for his achievements, his ground-breaking advancements and his contributions to the planetarium community.

However, in March 2009 the Stargazer Planetarium web site was terminated as, since the degradation of his eyesight, Ray felt that the perfectionism that has been the stamp of his work could not continue.

There is already an arrangement that a repair facility will continue at the Power Plastics factory and, despite his formal retirement from the field, the whole of BAP unite with the hope that this won’t be goodbye. Worthy was named a Fellow of IPS during IPS’08 in Chicago, and a photo of the new IPS Fellow appeared on page 42 in Planetarian 3/2008.

Canadian Association of Science Centres

In Canada, the major planetarium news is the completion of the nationally funded and produced show for the International Year of Astronomy, Galileo Live! As with two previous shows, four of Canada’s planetariums (in Vancouver, Calgary, Winnipeg and Montréal) combined their production resources (and grant-application power) to create an original show well suited to each of the theaters.

However, in this case, the show was a live theater production, utilizing a professional actor to portray Galileo. Each planetarium hired its own actor and stage director. The live actor’s scripted lines combine with taped narration (the voice of Galileo’s daughter as a young girl) and programmed visuals to make a unique show for their audiences this year.

AIP: Mobile Planetarium at Science Festival in Rome. Photo by V Vomero.

Superb panoramic all skies were shot on location in Italy by the folks at allsky.de. Authentic-looking and working replicas of Galileo’s 20x telescope (IMSS 2428) were built by Jim and Rhoda Morris of SciTechAntiques.com. They were used in the show, both as props and for audience members to look through following the show, and at outdoor observing events.

The TELUS World of Science in Calgary acted as the lead production facility, with Alan Dyer creating the script and Donovan Reimur in Edmonton providing the original soundtrack. Galileo Live! opened in Calgary and at the H.R. MacMillan Space Centre in Vancouver in March and opens in Winnipeg in June and Montréal (in both English and French) in October. Contact and information: Alan Dyer at alan.dyer@calgaryscience.ca.

In other news across Canada, other shows have been produced for the Year of Astronomy. The Manitoba Planetarium in Winnipeg opened Manitoba Skies in January, a year-long show in celebration of IYA. The show features celestial events that are easily observable, and provides a call to action to get visitors under the real sky. Thanks to the great handouts
produced by the Royal Astronomical Society of Canada, visitors walk away with a planetarium, a moon map, and a list of references to get them started in their own observations of the sky.

The Manitoba Planetarium's space exhibits outside the theatre entrance have been improved, thanks to support by the Canadian Space Agency and the Manitoba Museum Foundation. *Cosmos Corner* includes a frictionless microgravity trainer exhibit and a Canadarm flight simulator, as well as models of spacecraft and the International Space Station.

As part of this project, two new planetariums have been produced, based on the school curriculum: *To the Moon* covers humanity's past and future exploration of our nearest satellite, and *The Solar System Show* gives an overview of the planets and other objects in our solar system. Contact and information: Scott Young at scyoung@manitobamuuseum.ca.

In Montréal, work on the new Montréal Planetarium is continuing with five architecture consultants, winners of the first phase of the architecture contest, working on the more elaborate design of the new building in the second phase of the contest. The grand winner will be known early in June 2009, and staff is looking forward to working with them on all the fine details of the new theatres.

Meanwhile, Montréal opened a new show in May in the old planetarium titled *Telescope: Passport to the Universe*, a show about telescopes for IYA09. The planetarium team is also busy with lectures and special observing sessions in and around Montréal in parks across the city, continuing until January 2010. Contact and information: Pierre Chastenay at chastenay@astro.umontreal.ca.

**European/Mediterranean Planetarium Association**

While welcoming 2009, in what promises to be a very exciting year for all planetarium colleagues worldwide, the Planetarium of the Thessaloniki Science Center and Technology Museum (TMTH) in northern Greece kicked off a series of public talks and presentations that in January with a public lecture by astronomy professor Harry Varvoglis on "Galileo, Pioneer of Astronomy," an event jointly organised by TMTH and the Association of Hellenic Physicists.

Also in January, astronomy professors Varvoglis and Avgoloupis presented a model astronomy CD to school teachers and explained how it could be used to teach astronomy to high school students.

For the organization of this event the TMTH Planetarium teamed up with the Association of Hellenic Physicists and the Hellenic Ministry of Education.

In February, in collaboration with the British Council and the Institute Francaise de Thessalonique, the Science Café welcomed art historian Ms. Meleziadou-Dompoula, who presented a talk on "Astronomy in Renaissance Art," with more to come in the months to follow.

The Eugenides Planetarium in Athens premiered its brand new production *The Death of the Stars* on 2 February 2009, with an introduction by Professor Christos Goudis, director of the National Astronomy Institute who, as chairman of the Hellenic Astronomy Committee, declared the official start of the Astronomy Year activities in Greece.

The Eugenides Planetarium, in its continuing efforts to remain in the ivy league of planetariums worldwide, has already upgraded, renewed and replaced several software and hardware components of its systems, as reported in previous Planetarim issues. To that effect, the director of the planetarium, Dennis Simopoulos, in collaboration with its technical director Manos Kitsonas and the Board of Trustees of the Eugenides Foundation decided that after 16,000 hours of excellent performance, the Barco-CRT projection system of the Eugenides Planetarium needs to be replaced as well.

The brand new projection system will that serve the Eugenides Planetarium for the next few years will consist of 12 Projection Design F32 projectors to be installed and integrated by Sky-Skan in July 2009.

**Middle Atlantic Planetarium Society**

Paul Krupinski, chair of MAPS Audit Committee, recently announced the names of the new officers. The following are the results of the election for the positions of president-elect, secretary, and treasurer of the Middle Atlantic Planetarium Society, effective at the end of the annual business meeting on 14 May 2009: for the office of president-elect, Patty Seaton; secretary, Sam Storch; and treasurer, Keith Johnson. Congratulations to the winners and many thanks to Ted Williams, Don Knapp, and Mike Smith for running for a seat on the Executive Board of MAPS.

The MAPS Annual Conference was held this year at the H. B. Owens Science Center in Lanham-Seabrook, Maryland 13-16 May. The Howard B. Owens Science Center, a 27,500 square foot facility owned and operated by the Prince George's County Public Schools, has as its mission to provide excellence in science and technology education through student centered programs and services.

The facility includes a Challenger Learning Center, a planetarium, a nature trail, and a reptile center. The 174-seat planetarium features a 16.5-m (55-ft) diameter dome and a Konica Minolta S-IV star projector.

**Nordic Planetarium Association**

The NPA Conference 2009 will be held in Sandnes, Norway 4-6 September. NPA and Jærmuseet wish you welcome to Jæren, a beautiful part of Norway with 25 km of sand beaches, stone fences and greenhouses. The conference will take place at Vitenfabrikken in Sandnes, close to the oil capital Stavanger and Stavanger airport.

The conference starts with a small session on 4 September in the new planetarium. The rest of the evening will be rather informal. The main conference day is 5 September until noon. In the afternoon we will take a trip to one of our beautiful beaches and Tungenes light house. The gala dinner will be served under the stars in the dome.

On 6 September, the sessions will be devoted to participants presenting their own planetariums and activities and a membership meeting (short). There will be some demonstrations of vendors as well. The conference will offer plenty of opportunities for talks, discussions and planetarium shows.

The conference fee is 1700 NOK. It includes 2 dinners, 2 lunches, 6 coffee breaks, and the bus trip on 5 September. Participants need to register by sending their name, affiliation, address, and a short paper abstract to irm@jaermuseet.no or to Jærmuseet, post-box 250, N-4370 Naerbo, Norway before 15 August. You will find accommodations at no.hotels.com/hotell-norge/hotell-sandnes.

For more information, contact NPA’09 host Ivar Reed Nakken, irm@jaermuseet.no, +47 9054 2566.

**Pacific Planetarium Association**

The Planetarium at the College of Southern Nevada in North Las Vegas is having a busy year celebrating the International Year of Astronomy. In addition to the 15 programs offered in the planetarium to both school children in Southern Nevada and to the general public, they have hosted the SoHo Sunworks traveling exhibit (sohowww.nascom.nasa.gov/sunworks/exhibit.html).

This is an imaginative, diverse exhibit of art from artists of all ages and from all around the world whose themes feature the sun. This exhibit kicked off the year. It has now been moved to Loma Linda California.

Recently the planetarium was visited by Dr. Dana Backman of the Stratospheric Observatory for Infrared Astronomy (SOFIA), speaking on "Astronomy at 41,000 feet: The story of NASA’s Stratospheric Observatory for Infrared Astronomy (SOFIA)." For more information, contact Pam Maher, Planetarium/NASA Educator Resource Center CN2, Sort Code S2A, 3200 East Cheyenne Avenue, North Las Vegas, Nevada 89030-4296, USA. (41,000 ft = 12.3 km.)

Mt. San Antonio College Planetarium at
Walnut, California is having a major upgrade. Bowen Technovations provided all new LED lighting, audio, control system, production tools and a Digistar 4 SP2 HD all-dome system to wrap around their new Zeiss ZKP-4 star projector and new Spitz dome. All theater systems are under control of AstroFXCommander. For more information, contact William Eastham, Mt San Antonio College, Weastham@MtSAC.edu.

The planetarium programs at the academy are both live and automated. They begin with a live narrator, who then launches into the automated program. Near the end the narrator comes back and does an updated program and a night sky program. The programs run about 30 minutes. Other fascinating exhibits at the academy include a penguin workshop, an exhibit about evolution and the Galapagos, a rainforest exhibit, and a 3-D bug program.

Edna DeVore of SETI Institute and past president of PPA recently returned from Florida, where she witnessed the launch of the Kepler mission. Edna talked about the excitement of watching Kepler launch. “There was the big initial blast. We saw it while it got 5-8 degrees above the horizon and then we heard the sound because we were several miles away. Among the others watching with Edna were Dave Koch and the originator of Kepler, Bill Baruke. It had been 25 years from Bill Baruke’s first paper about the Kepler Project to the date of the launch.

The anticipation for launch was magnified because there were only two windows of opportunity to launch: at 10:48 p.m. and 11:40 p.m. The first night they could not launch in either window, so tension mounted in the second night. Fortunately, Kepler had a successful launch in the first window. Now support groups and ground-based observatories for the Kepler Mission are working to gather the photometry data to meet the mission goals; see kepler.nasa.gov.

A wealth of images and animations for planetariums also is available on the Kepler Mission website in the multimedia section. A 30-minute planetarium program about Kepler is called Strange Planets. To get the show kit, visit the Planetarium activities for Student Success (PASS) website at lhs.berkeley.edu/pass. Kits will be distributed in summer 2009, and can easily be used as part of any International Year of Astronomy activities. Questions? Contact Edna DeVore, edevore@seti.org, or Alan Gould, agould@berkeley.edu.

Russian Planetarium Association

The IYA 2009 Local Organizing Committee headed by the mayor has been formed in Nizhny Novgorod. The IYA official opening was celebrated on 3 January at the Nizhny Novgorod Planetarium by the meeting of representatives of the scientist community of the city and the presentation of the full-dome digital 3D show The Milky Way: A Journey over the Asterowheel.

A Planetarium Lecturer Workshop was held on 1-4 March in Moscow at the planetarium of the Army Cultural Center. The workshop was attended by planetarians from 21 cities, including Minsk in Belarus, Dnepropetrovsk in Ukraine, and Aktyube in Kazakhstan. Famous scientists from the Sternberg Astronomical Institute of the Moscow State University delivered a dozen lectures on contemporary problems in astronomy and astrophysics.

A new ZKP-4 star projector was delivered by Carl Zeiss Jena on 5 March 2009 at the planetarium of the Ziolkowsky Museum of Cosmonautics in Kaluga. The funds for purchasing this star projector have been allocated after a visit of Vladimir Putin to the museum in 2007.

Barnaul Planetarium dedicated the contest Become an Astronomer and Reveal Your Innerspace Stars to the IYA 2009 and drew participation from authors of over 200 creative works from different districts of the city and the region. The contest results were widely announced in mass media on 11 March. This planetarium hosted the Russian Planetarium Show Festival and the exhibition “Planetarium in Russia and Worldwide” in March.

A 3-day open educational workshop devoted to the 130th anniversary of Albert Einstein was held 18-20 March at the Nizhny Novgorod Planetarium. The workshop was attended by schoolchildren and schoolteachers, students and university lecturers, amateur astronomers, retired people, and the general public. The workshop program included invited lectures delivered by scientists from the
Space Research Institute of the Russian Academy of Sciences (Moscow) and Ioffe Physico-Technical Institute of the Russian Academy of Sciences in St. Petersburg, and demonstrations of fulldome digital shows.

Zinaida Sitkova has been invited to the IYA 2009 National Organizing Committee. The central event of the IYA 2009 in Russia is the All-Russia Conference Astronomy and Society held 25-27 March at the Moscow State University. Issues related to activities of Russian planetariums were discussed during the roundtable devoted to popularization of astronomical knowledge. The appeal of the Russian Planetarium Association to the conference attendees, initiated by Sitkova, was uploaded to the conference site in advance. The appeal comprised a draft of the note to the president and the prime minister of the Russian Federation to implement well-defined measures aimed at improving domestic astronomical education.

Southeastern Planetarium Association
SEPA has experienced a large number of personnel changes over recent months. The increased mobility reflects both normal changes within the region as well as changes based on the fragile state of the economy.

Eric Melenbrink, formerly of the Science Museum of Virginia, was forced into early retirement as a result of restructuring. Melenbrink has ratcheted up his involvement with Ash Enterprises International, where he serves as vice president and head of accounting. Jim Greenhouse has returned the Mark Smith Planetarium at the Museum of Arts and Sciences in Macon, Georgia.

Laura Sessions is in charge of the Aldrin Planetarium at the South Florida Science Museum in West Palm Beach, Florida. Mark Wallace is director of the planetarium at the Adventure Nature Center in Nassau, Bahamas. Eric Thomas of Prestonsburg, Kentucky will assume the position of director at the new planetarium at Morehead, Kentucky.

Dave Maness, formerly of the Virginia Living Museum, is director of the Sharpe Planetarium in Memphis, Tennessee. Steve Nipper is director of the new Chronos planetarium at the Museum of Science and Industry in Tampa, Florida.

SEPA’s annual conference for 2010 is scheduled for Kingsport, Tennessee. For more information about SEPA, please visit their website at sepadomes.org.

Ukrainian Planetariums Association
On 22-23 March Ukrainian planetarians met in Kyiv Planetarium. Colleagues watched the programs, exchanged opinions and experiences, and listened to a lecture about the sun presented by Vsevolod Lozitsky, professor of Kyiv University. Each day of International Planetarium Day celebration, 21 and 22 March, Kyiv planetarium offered one free admission lecture and one new program to its visitors. The new programs were about Saturn and about discoveries by Hubble Space Telescope. These programs included sections of the movies Ring World 2 by JPL and Hubble Space Telescope-15 years of discovery by ESA.

The planetarium also announced a competition for paintings and drawings by children about space. The drawings that were already received got their place in Stellar Hall to be observed by planetarium audiences.

In Kharkov planetarium, IYA 2009 was opened 10 February. Astronomers from Kharkov took part in the celebration, presenting lectures about the opening of IYA in Paris and astronomy in Kharkov. Ancient astronomical devices, globes of the sky, the moon, and the planets were exhibited as well as rare books and photos on history of astronomy in Kharkov. Other IYA projects include the 100 Hours of Astronomy, a competition for “space viewed by children’s’ eyes,” and the festival Space and Culture.

On 20 March Kharkov planetarium participated in an international action called The Peace Bell. This is a symbol of friendship and solidarity of nations, and an appeal to protect peace and life on the planet. The first Peace Bell was cast in 1952 and given by the Japanese people to the United Nations. It is placed
The Zula Patrol

Under the Weather!

“Sesame Street in Outer Space”
- The New York Times
in the United Nations headquarters in New York. The bell is made of melted coins gathered by children from all over the world. Every year on the spring equinox day (which is also close to the International Planetarium Day) the bell is rung. A theatrical program under the starry sky of Kharkov planetarium reminded once again, that the Earth is our common house.

Donezk Planetarium, which is the only digital planetarium in Ukraine, prepared a new program for children called Among Stars and Planets. The new digital equipment also was used to introduce lectures on the starry sky of the spring. In April-May, the planetarium offered telescopic observations to its visitors, and observations out of the city. It is also planned to start a drawing competition for children called “drawing a cosmos.”

Dnepropetrovsk Planetarium had a celebration of planetarium day on 23 March. After the planetarium program children were asked to name constellations that can fly, live in water, and eat grass. Each correct answer was graded with a star. Winners got maps of the sky, movies about space, and other prizes. On 7 March was one of the astro club gatherings with a master class by Nataliya Virnina on searching for variable stars. Oleg Shilov, one of the astro club members, demonstrated a video of the partial lunar eclipse of 9 February.

In the framework of IYA, Kherson Planetarium launched a series of programs under the name A Person of the Universe, in conjunction with the program Star Language by the TV channel VTV+. Programs include stories about Kazimirchak-Polonskaya, Kepler, and the main astronomical observatory of Ukrainian Academy of Sciences. On 22 March a photo exhibition, Treasures of the Universe, started at Kherson Planetarium. The planetarium offers days of free admittance to its program for handicapped children.

International Relations Committee

Martin George
martingeorge3@hotmail.com

You will recall that in the previous issue I mentioned that the construction of the new planetarium in Macau was making good progress, with an opening expected during 2009. I am pleased to report that all is still well with their project. I have been in regular contact with Mr. Chee-Kuen Yip, who kindly hosted me during my visit in late 2007, and Ms Nicole Wong, of the Macau Science Center’s Marketing, Promotion and Development Department.

By the end of March 2009, the external structure had been nearly completed, and the internal construction had started. PCCW (Macau) Ltd., under a partnership with Sky-Skan, was awarded the contract for the design and construction of all of the equipment and related services inside the building structure at a total turnkey cost of approximately US$6.3 million. This includes the projection dome, seating, and an ultra-high definition 3D digital projection system together with related equipment. Construction work is expected to be completed later this year. The planetarium will have a 15-m (51-ft) tilted dome with approximately 140 seats.

The building of the Macau Science Center, of which the planetarium is a part, was designed by world-renowned architect I. M. Pei with Pei Partnership Architects. It is built on reclaimed land in the southeastern part of the Macau Peninsula. Construction started in 2006 and is also expected to be completed this year. In addition to the planetarium, the Science Center will house an exhibition building with 14 galleries of about 6000 square meters (60,000 square feet) of exhibition space and a convention centre with four seminar rooms for 500 participants.

I am looking forward to learning of the planned date for the opening!

Alexander Serber has supplied some updated news from Moscow, where the famous planetarium there has been closed for quite some time. The planetarium is now owned by the city government and we understand that there is some progress in the goal of reopening the facility by 2010. It has been agreed that the planetarium will be equipped with a Zeiss Mark IX Universarium projector, but there is still a little uncertainty over the digital system that they plan to include. I am looking forward to more news from Moscow in the months to come, and am grateful to Alexander, who is a member of our committee, for keeping us informed.

Meanwhile, the IPS has recently been approached for comments on a plan to build a planetarium in Gaza. The officers have been considering the level of IPS involvement in
this welcome idea, and the request is now also being considered by
the International Relations Committee for comment. I’m sure that
the IPS will be very supportive. I always love to learn of the con-
struction of a new planetarium, and especially in parts of the world
that have not yet had the advantage of such a facility in their area. I
hope to bring you more information about this venture soon.

I regret that, in the previous issue of the Planetarian, we were not
able to include pictures of the opening of the new planetarium in
Accra, Ghana. It is a project in which IPS President-Elect Dave Wein-
rich, together with Joanne Young of Audio Visual Imagineering,
have been very much involved.

You will recall reading of the project in the December 2007 issue
of the Planetarian. For some time, Dave has had a great interest in de-
veloping countries. It all began when Dave was on a trip to Ghana in
2006, during which he met up with Dr Jacob Ashong, who was very
enthusiastic about building a science centre and planetarium. After
a lot of good work by Weinrich, Young and many others, the proj-
ect has come to fruition, using a refurbished Medialoglobe projector
donated by Young. The planetarium was opened on 22 January by
the British High Commissioner, His Excellency Dr. Nicholas West-
cott. Thanks to Dave Weinrich for providing the photographs of the
event, appearing with this article.

The establishment of a planetarium in Ghana is an especially
wonderful achievement when we look at the scarcity of planetar-
iums in Africa, and especially sub-Saharan Africa. Until the Ghana
project was completed, South Africa was the only African country
south of the Sahara with any planetariums. Let’s hope that this plan-
etarium will be the first of many that will bring the joys of visiting a
planetarium to more people on the African continent.

IRC: (Above) The Ghana Planetarium is all decked out for its January
2009 inauguration. Photo by Jane Ashong. (Right, from top): On behalf
of IPS, President-Elect Dave Weinrich congratulates the Ghana Planetary
ium. Photo by Mike Puplampu. Dr Jacob Ashong, Director of the Ghana
Planetarium, and his wife Jane try out the Starlab Projector donated by
the Detroit Science Center. Photo by Dave Weinrich. Dr. Jacob Ashong
leads the British High Commissioner and the chiefs through the Astronomy exposition. Photo by Mike Puplampu.
Under One Dome - from page 17

large groups could split into a number of sub-
groups with each group eventually rotating 
through each activity. Schools would make a 
whole day of this and we quickly called these 
“Radford University Science Days.” Our num-
bers have increased yearly such that 2008 saw 
nearly 1,100 visitors just for these big produc-
tions.

Over the years I could never have managed 
without the help of some Radford University 
students. Running the planetarium is actually 
not a part of my job of being a teaching and re-
search faculty member.

Over the past eight years I have actually had 
only 3 students help me. The first student did 
this for one year, the next one for two years, 
and the next, for 4.5 years. This last student, 
Dustin Lackey, graduated in December 2008 
and hopes for a long career in the planetarium 
field. I currently have a new student running 
the shows and she should be with me for an-
other one to two years, depending upon when 
she graduates.

I have worked over the years to improve 
the planetarium in any way that the budget 
allowed. That budget, by the way, is zero dol-
ars per year. Nothing allocated. Everything is 
hand-me-down equipment supplied by Rad-
ford University, equipment that I have bought 
(eBay!) or built, or that has been on semi-per-
manent loan from around campus.

I was able get the place painted very dark 
blue-black. I bought the paint and Radford’s 
Facilities Management supplied the painter 
s and their oh-so-quick sprayers. It was an 
amazing transformation. Eventually Radford 
replaced the original carpet that had been 
installed in 1971. That was also transforma-
tive, since the whole place is now dark as one 
would expect.

I was able to update the sound system by 
using the original power amplifier along with 
a relatively-inexpensive DJ mixing board. I 
brought my 30-year-old stereo speakers from 
home and things sounded better and better. I 
eventually obtained my brother’s old speak-
ers—which were much better than mine—af-

ter my sister-in-law decided she was tired of 
them gathering dust in their attic.

New shows have been acquired either for 
free (I found that begging is very effective) 
or through donations. On occasion Radford’s 
administration has carefully scraped togeth-
er unexpected year-end funds and used that 
to purchase commercial shows. In addition to 
the shows there are always sky tours.

I switched from slide projectors to com-
puter-driven digital projectors in the fall of 2005. 
Again, Radford supplied the surplus comput-
ers and projectors. After a couple of all-night-
ers installing these projectors, things were 
looking better and better. The images from 
the shows became a number of PowerPoint 
shows advanced by the operator manipulat-
ing 6 keyboards at once and paying careful 
attention to the scripts. Returning visitors re-
marked on the continuing evolution of the 
place.

I have recently been able to take the next 
step. Dr. Patricia Reiff of Rice University told 
me at a recent AGU meeting about a cheap 
way to create a fulldome setup. Using a quar-
ter-sphere mirror would allow one good digi-
tal projector to throw its output over the en-
tire dome. I installed this in January (2009) and 
this has proven to be a spectacular upgrade.

And at some point who knows—we may 
finally have a budget. But then again, may-
be it wouldn't be as much fun.

President - from page 19

El Alamein site. There is a huge number of 
new houses, resorts and apartments, all built 
along the shores of the amazingly blue Med-
iterranean Sea. More striking still was the El 
Alamein WWII Museum nearby, where the 
shattered hulks of tanks and guns from that 
era sat outside on plinths.

Inside, each of the nations involved in the 
conflict had their story told with respect: the 
uniformed mannequins, artifacts and dior-
amas recorded the common struggle to survive 
in the desert that was experienced by the Ger-
man, Italian, Egyptian, French, Polish, Greek, 
Commonwealth and UK soldiers: all fought 
bravely and many did not return home.

I am sure that all of them spent some of 
their enforced chilly nights out looking up at 
the constellations as they wheeled across the 
desert’s dark night sky, and wished that they 
were back home. Like many places in Egypt, it 
is a good place for reflection.

Elsewhere in Egypt the city of Cairo has the 
world-famous Egyptian Museum, where the 
treasures of the young Pharaoh Tutankhamun 
are on display, and the sites of Upper Egypt 
are obviously worth exploring as a side trip. In 
the city of Alexandria there are well-preserved 
and easily accessible archaeological sites with 
a Roman amphitheatre, the original Universi-
ty of Alexandria and underground catacombs, 
all served by knowledgeable guides who speak 
many languages.

To help our French-speaking APLF col-
leagues decide to attend, I have arranged with 
the BA that there will be simultaneous transla-
tion services at the 2010 conference with Eng-
ish, Arabic, and French being the languages 
that can be used. I think that it will be a mem-
orable conference and urge you to consider 
planning to attend next year.

In the meantime, I wish all of you well in 
these very difficult times and hope that you 
see the green shoots of recovery sooner, rather 
than later. Good Luck to you all.
One-man band

Astronomer, Technician, Administrator, Child Wrangler...

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

Introducing definiti* Solo

a LOT of content
Runs the complete DigitalSky 2 package and shows. Lots of premium built-in content.

little maintenance
One projector, one lamp.

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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 definiti* 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 definiti 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.

PM
Glendale Community College Planetarium students experience Gliese 581 c.

experience

"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.
Using Fulldome to Broaden the Scope and Grow the Audience
(Making the Most of Immersive Dome Cinema: Marketing and Branding, Part II)

A digital dome (fulldome) theater can give the audience a sense of being in space without boundaries. Likewise, facilities with fulldome theaters are finding the presentation medium opens up their own boundaries—extending the possibilities of what a planetarium can do and perhaps even what it calls itself. The inherent versatility of fulldome paired with the resourcefulness of an institution’s educators and marketers equals a powerful combination able to create, recognize and make the most of opportunities.

Burke Baker Planetarium: the fulldome “tail” of HMNS

For Dr. Carolyn Sumners, vice president of Astronomy and Physics at the Houston Museum of Natural Science, necessity is as much a factor as the inher-ent versatility of the Sky-Skan fulldome projection system that’s filled her dome theater since 1998. With a shoestring marketing budget and keen observation of her audience, she drives the planetarium to make a profit, selecting and editing licensed content to complement other programs at the museum, and creating in-house productions that are as frugal as they are ingenious.

“We are the tail that never will wag the dog,” she frankly observes. “We compete every day with the largest butterfly center in the US (Cockrell Butterfly Center), an Imax 3D theater (the Wortham Imax), permanent exhibit halls and from two to four traveling exhibits—all with advertising budgets. You just get over it.”

Sumners’ way of getting over it is to piggyback and to cultivate sponsors. “Everything I do, I’ve got to find a sponsor for. I’m always doing outreach and teaming up with others. With one exhibit a year at least, we have a co-marketed fulldome show that ties in.”

She reports having had good success showing *The Body Code*, an educational trip through the human body at the cellular level (and a derivative of Evans & Sutherland’s *Microcosm*), as an adjunct to the blockbuster exhibition Body Worlds. “The show feeds the exhibit, and the package is very good value for school groups.” Traveling exhibits that carry a high ticket price can be challenging, however. “People will not spend more than $25 per person.”

The Burke Baker runs 12 shows a day on the half-hour, and the mix of astronomy and non-astronomy programming works, from elementary-level interactive astronomy labs in the mornings, to family-friendly afternoon shows (*Zula Patrol*, *Secret of the Cardboard Rocket*, *Earth’s Wild Ride*) to special evening shows (*U2 Concert*, *Dark Side of the Moon*). “Had we not provided a more diverse experience, we would have died,” states Sumners. “One-third of our shows are pure astronomy and most of the rest have some mixture, or some earth science.”

Non-astronomy shows include *Body Code*, *Secrets of the Dead Sea*, and *Lucy’s Cradle*, the

Judith Rubin, based in St. Louis, Missouri, USA, is an editor, writer and publicist for the visitor attractions industry. She is director of communications for IMERSA.
sensation without having to do stereoscopic projection and it’s not competing directly with the home theater or the cineplex. What we need most is branding and repositioning in the market so that we can take over some of the natural science audience no longer served by the Hollywood IMAX products.”

An additional revenue generator for the Burke Baker is the traveling dome program, which reaches another 40,000 people a year, mostly schoolchildren. Sumners keeps two domes out in the field on a regular basis. “It costs half the price of a field trip and no bus,” she explains. “We call it the Discovery Dome—the planetarium brand isn’t there at all.”

Necessity has obliged Sumners to stay keenly in tune with a changing audience and make the most of available resources. “We just have to be market-driven,” she says. “If the market wanted only live star shows, we’d do live star shows all day. No matter what you want to show, your audience will always define you at the box office.”

Rebranding and the holodeck
As director of show production/marketing for Evans & Sutherland, Michael Daut has overseen his share of fulldome installations. Since its military simulation division was acquired in 2006 by Rockwell Collins Corp., E&S has focused exclusively on the planetarium sector.

Like Sumners, he sees fulldome shifting the boundaries, and redefining planetariums as dome theaters through sheer versatility and the appeal of diverse content to modern audiences. He points to the success of non-astronomy fulldome shows such as Ice Worlds (about climate change, it has been licensed to a dozen venues in its first six months of release), the ability of systems to stream unique material from sources such as NASA, and fulldome venues, such as Planetarium Hamburg (E&S Digistar 3 system), that have embraced a wide spectrum of material.

“Fulldome changes the flavor of the theater and every operator has a different way to position it,” says Daut. “Some never run a canned show, and others would never run a music entertainment show. It can be a multimedia theater in one context, and a planetarium in the other. Planetarium Hamburg is a phenomenal innovator, with a very full slate of shows on any given day: kid’s shows, music shows, live astronomy shows, laser light shows. They’re really pushing what can be done in this immersive space.”

Facilities should do some form of rebranding when they convert a theater to fulldome, in order to get the attention of the community and let them know something new and different is available, advised Daut. “Theaters that have not made effort to distinguish have all but hidden their great new potential. If you’ve been around for a while as a planetarium, and don’t intentionally try to rename or rebrand, I think you’re making a mistake. There needs to be some other noun or phrase that makes clear the theater is special or unique. Fulldome digital theaters have the potential to provide a nearly unlimited variety of immersive content. Of course they also provide an amazing canvas that allows audiences to explore the universe as never before.”

Likewise, theater owners and operators should make the most of the system’s unique features, such as streaming and Internet connectivity, to help differentiate the experience. “You can project onto the dome instant updates of the latest news and scientific discoveries within minutes of their being posted on a website—such as images from NASA, or the latest Hubble photo or wherever you’re linking to,” he explains.

And they should experiment. “This is a business like anything else, and it is driven by the customer’s appetite. If you can create a varied palette, you can get more demographic variety and repeat business, and people will begin asking what’s coming up in the fulldome theater next. It’s the same thing that drives people to the movies—only the experience is more fresh and surprising than movies. There are tools inherent in the systems that allow you to do things that a movie theater can’t do. It’s a cool discriminator—a reason to pile the family into the car so you can experience something you could never do at home.”

Daut continued to name possibilities. “You can have events where school groups come in, take pictures of birthday kids in the lobby and then put them on the screen inside the dome. I’ve heard of weddings in domes, and even funerals. Some theaters have movable seats so you can things up for a special event inside the dome, and with the simple ability to capture fisheye photography these days, you can grace such an event with beautiful scenes slowly changing overhead. It’s not out of character for a science museum or planetarium to consider these things. Corporate (Continues on page 39)
it’s easy to make **NOISE** about education

education!

Other full dome providers talk about educational resources in their digital systems. Spitz goes beyond talking about teaching: We deliver. **SciDome**, powered by Starry Night, includes award winning space science curriculum for elementary, middle, high school and college, including unparalleled teaching materials and classroom resources. With SciDome, inquiry-based learning happens inside the dome and in the classroom, with lessons and activities designed to fulfill your school’s requirements for science education.

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TEACH bigger

www.spitzinc.com
SciDome is the only fulldome system that gives you the core teaching materials, lessons and programs needed for astronomy education. The classroom curriculum engages teachers in your area schools, and helps attract classes to the planetarium. To learn more about SciDome, and the teaching capabilities of Starry Night, contact Spitz.
events can use the dome as a huge, immersive PowerPoint canvas to get a big message across. These can be sources of ancillary revenue that should be considered by operators who are well located to take advantage of it. Often it makes most sense to plan for a dome environment that can do multiple things."

There's no doubt in Daut's mind that full-dome still has vast, untapped potential to go where no audience has gone before. "I think we've only scratched the surface of an extraordinary new visual and sound medium. I think the boundaries will continue to expand as more and more people are showing interest in licensing alternative content."

"Over time we'll see the genres expand and the types of material covered in the dome grow beyond what they are today. Theater operators will have multiple options for their visitors, and the ability to keep them in the facility that much longer. It's very exciting to be on the ground floor of something that has limitless potential to define and redefine educational and entertaining experiences - it's one more step towards realizing the Star Trek holodeck."

**Fulldome events**

Representatives of IMERSA, the Producers Guild of America and the Themed Entertainment Association partnered with the Griffith Observatory to produce a May 18 educational event to acquaint some 200 media producers to the fulldome digital medium, its vendors and institutions, and the educational community that they serve.

The introduction of new creatives to the field will help grow the library of quality content for fulldome theaters, raise production values, and inspire new directions.

Thanks are due to Griffith curator Dr. Laura Danly and Director Dr. E.C. Krupp, Michael Daut of Evans & Sutherland, Dina Benadon of the Producers Guild, Daren Ulmer of the Themed Entertainment Association, and Ed Lantz of IMERSA.

In Nashville, the SEPA 2009 Conference will run June 16-20 at the Sudekum Planetarium of the Adventure Science Center. The program includes a 90-minute "Fulldome 101" workshop on June 18 with IMERSA co-founder Dan Neafus of the Denver Museum of Nature & Science.

For those who wish to get involved more directly with the IMERSA organization (IMERSA is young and growing and in need of members, officers, sponsors and volunteers), there is a roundtable on June 20. For more information about the event, visit sepadomes.org. For IMERSA information, contact Dan Neafus at dan@imersa.org.

DomeFest, the annual fulldome video festival, will take place in Albuquerque, New Mexico this July 17-20. At this gathering, organized by IMERSA founding board member David Beining of the University of New Mexico's ARTS Lab, operators of fulldome theaters can shop for content, those who are considering fulldome can learn more about it, and producers and distributors can discuss their work.

In connection with DomeFest, IMERSA will support the Fulldome Summit featuring a full day of technical papers focused on innovations in fulldome production. For more information check the website www.domefest.org, www.imersa.org or contact David Beining at dbeining@unm.edu.
How Planetaria, Science/Visitors Centers and Observatories Can Get Involved in IYA

If you represent a planetarium, science/visitors center or astronomical observatory, here are some ideas for how you can participate in the International Year of Astronomy 2009, celebrating 400 years since Galileo began observing the heavens through his telescope. We hope that the programs and connections that come out of IYA2009 will continue for many years to come!

Ways to get involved and learn more about IYA right away:

- Visit the international IYA2009 website; watch the IYA2009 movie trailer, and show it while an audience is waiting for other events to begin. (www.astronomy2009.org)

- Visit the U.S. IYA2009 website for new developments, programs and materials (www.astronomy2009.us). Also see NASA’s website (astronomy2009.nasa.gov/), which has a monthly calendar of suggested objects to observe and related activities.

- Visit the website of the IYA2009-affiliated program 400 Years of the Telescope (www.400years.org), watch the trailer, and sign up for the program’s monthly newsletter. Other free newsletters with IYA2009 and astronomy updates are written by the Astronomical Society of the Pacific (www.astro society.org/pubs/newsletter.html) and Universe Today (www.universetoday.com/, sign up on the right-side toolbar).

- Adapt existing astronomical programming and cross-promote programs with IYA2009 for increased impact (local, national and international).

- Participate in the IYA2009 working group for Planetaria, Science/Visitors Centers and Observatories by contacting Peter Michaud (Gemini Observatory, Chair at: pmichaud@gemini.edu) or Shawn Laatsch (Imiloa Astronomy Center, Co-chair at: slaatsch@imiloahawaii.org).

- Use IYA2009 logos on your website(s) as an “IYA Supporter”; U.S. logos are available at www.astronomy2009.us/newscenter/logo-graphics, and international logos are available at www.astronomy2009.org/resources/.

How your institution can get involved in IYA for 2009 and beyond:

- Show a planetarium program that has been developed for IYA2009.
  - Two Small Pieces of Glass - produced by Interstellar Studios, Imiloa Astronomy Center of Hawaii, and Buhl Planetarium - has both traditional and full-dome versions available. (www.400years.org and click on the Planetarium tab)
  - Let There be Night planetarium program features original narrated video that can be shown in a planetarium or be used as a stand-alone video. (www.LetTherebeNight.org and click on the Planetarium tab)
  - In Search of Our Cosmic Origins will be available in many languages in traditional and full-dome versions. (www.cosmicorigins.org)

- Participate in star counting events to raise awareness about dark skies and light pollution:
  - How Many Stars, an ongoing global citizen science program (www.sternhell.at)
  - Great World Wide Star Count, October 9-23, 2009, and October every year (www.windows.ucar.edu/citizen_science/starcount/)
  - GLOBE at Night, first half of March every year (www.globe.gov/GaN/)
  - Earth Hour, late March every year (www.earthhour.org)

- Print out or install a “From Earth to the Universe” astronomy image exhibit. (www.fromearthtotheuniverse.org/)

- The "How to Host an IYA Event" webpage has ideas and resources, such as templates to make a 2-fold brochure and press release (www.astronomy2009.us/howtohost/).

- The "How to Get Involved in IYA2009" webpage has handouts for groups such as teachers, families, amateur astronomers, home school groups and more. (www.astronomy2009.us/getinvolved/)

I’ll trade you a Keck for the Subaru ...

What can be cooler than a set of your own Mauna Kea brand IYA2009 trading cards? You can download the PDF files of the cards and print them out by yourself. The cards are only for astronomy education, public outreach, and personal use and cannot be used for profit. The brainchild of the Mauna Kea Observatories Outreach Committee, there are 56 cards to trade, which also provides a full deck for use as playing cards. Download them at www.naoj.org/IYA/Cards.

The Starry Messenger

Check out an educational film drama to celebrate IYA2009, made by members of the Centre for Astrophysics Research at the University of Hertfordshire, UK. The official site is star.herts.ac.uk/starry-messenger.

Astronomical Chocolate

Coinciding with IYA2009, the ninth edition of the International Contest of Chocolate Figures has chosen astronomy as its theme. The exhibition, “The Celestial Worlds-400 years of the discovery of the solar system,” combines real objects with the art of chocolate-inspired figures in the world of astronomy. For mouth-watering details (in Spanish), see www.pasteleria.com/noticias/view/chocolate-astronomico/01777.

Gosh, Win it All!

In April, the creators of Second Life announced that Let There Be Night, the IYA2009 project spearheaded by Great Lakes Planetarium Association Members Chuck Bueter and Art Klinger, was one of the ten finalists for the inaugural Linden Prize. The prize was a $10,000 award (in Linden dollars) for the project “that has helped make Second Life practical for the real world.” Winners were Studio Wikitecture and Virtual Ability in a tie. “The bottom line is that the SL environment allowed us to generate instructional video for our students, and then pass that resource on to hundreds of other astronomy educators internationally for a negligible cost,” wrote Bueter.
Navigar Foundation hosted the Immersive Film Festival at Centro Multimeios of Espinho, Portugal, April 24-26. The program included 25 fulldome shows plus 23 new works submitted in a creative competition.

Sponsors included Sky-Skan, RSA Cosmos, Global Imagination and Map Cards. Evans & Sutherland provided the fulldome system. Full information and clips can be viewed at iff.multimeios.pt.

From a set of finalists, selections were made in four categories by the jury (Dan Neafus, Mike Bruno, Michael Daut, Francisco Costa and Sara Oliveira), excepting the Audience Award, which was selected by public vote.

WINNERS:

**Best of the Festival and Audience Award:**

**Hijos del Agua**
Sky-Skan
Germany

**Best Immersion:**

**Adamas**
Softmachine
Germany

**Best Soundtrack:**

**History**
NSC Creative
United Kingdom

**Best Visuals:**

**Launch**
NSC Creative
United Kingdom

**FINALISTS:**

**Paperworld**
Warik Lawrence
Australia

**Future Memory**
Amanda Philips/Alexander Mitchell
Australia

**Living in Space**
NSC Creative
United Kingdom

**Living...Flying**
Ilusa Media
Spain

**Natural Selection**
Mirage 3D
The Netherlands
See it online! thenatureofscience.org
Internet groups for portable planetariums

Aside from vendor specific user groups, there are two generic groups you should all be aware of if you want to have a venue to talk specifically about the concerns of portable planetariums. If you work with a portable system, it would be advantageous for you to join one or both of these groups and see if they serve your needs.

The first group is truly just for portables and is part of The Planetarium Network. Rovy Branon created this online social network, which currently has 417 members. The part of this network I am talking about is the Portable Domes Group at www.planetarium.net/group/portabledomes. Christi Whitworth from Rosman, North Carolina created this particular group. At the time of this writing the group has 18 members, from 10 states and four countries. Currently there are three topical threads:

1. Long-distance travel with portables

Here people discuss questions that members have about travel logistics for those with only one or two presenters available for their portable. The questions include:

- How far away from home base do you travel?
- Do you travel to destinations requiring overnight stays? If so, do you have any policies for scheduling multiple days?
- What is your policy for canceling due to inclement weather—either if the school closes, or you think traveling in the weather is too risky?

2. Who’s got what?

In this section members are asked to state what systems they use. This information can be used by the group to generate a list of FAQs for the specific units. Sometimes questions may apply to all types of projectors, but lots of times the question will be case specific. Members also want to create a small database of projector information.

3. Digital portable systems—technical help

If you use a digital system in your portable dome, this discussion may provide the help or contacts that you need to solve problems.

The second group you might be interested in is called the Small Planetarium Yahoo Group. The description of this group reads “A friendly group for folks interested in building and/or operating a planetarium. There is a wide range of possible uses for small planetariums ranging from traditional astronomy education, to some of the new opportunities in wider science education, visualization, art, and entertainment offered by fulldome digital projection. Backyard enthusiasts, operators of portable planetarium businesses or permanent planetariums, equipment vendors, and content suppliers are all welcome.” Go to tech.groups.yahoo.com/group/small_planetarium.

GeoDome Theater

Not having much free time to wander the vendor floor at IPS 2008 (IPS officer duties claimed almost all of my time), I was happy to be able to explore a bit more at the GLPA 2008 conference this past October.

I would like to highlight one particular system in this column. The Elumenati’s GeoDome Theater demonstration really caught my eye and imagination. First of all, the dome construction is rather unique. To close the doorway, all that is necessary is to drop a cloth down to block out the exterior light. That makes it extremely accessible for people of all ages and those with physical disabilities.

There are three concerns about this system. The projection is truncated on the dome; some see this as an advantage and others a disadvantage. The Elumenati’s engineer explains the reasons behind the GeoDome design decision: “First, truncating the projection makes optimal use of resolution, providing 33% better resolution and brightness over traditional digital fulldome projection. Second, and perhaps more importantly, this configuration allows the audience to sit above the springline, with their line of vision above the horizon line, and screen area below their feet. It’s this ‘feet on the ground’ perspective that creates the increased sense of presence that makes the experience of being in a GeoDome so profound.”

Moderating the heat generated by digital systems is a problem and The Elumenati has addressed this issue; their recently improved dome design includes a vent at the back through which a second fan can provide ventilation and their new projector housing emits less heat than the previous model.

The price point is higher than that of most mobile planetariums, but the unique networking and the data scaling features of Uniview, as well as the varied datasets it supports, make this portable system a tool for teaching more than just astronomy.

These features, and all that they imply for regional, national and international collaborations, are extremely compelling. They make available, as The Elumenati’s ad states, “interactive discovery on a global scale.”

To me, these are the ultimate up-to-date tools to have in a mobile planetarium. Directors of mobile domes usually serve populations in isolated areas. These tools can enable them to connect students and teachers to the universe, to people in countries around the world and to the research community in ways never before possible.

One example of using the networking feature of this system is the very successful domecast at the opening celebration for the Ghana Planetarium. People from three different con-
tents were able to celebrate this special occasion together on that day, thanks to SCISS donating the Uniview software to Ghana and The Elumenati donating the computer on which it ran! This dome-cast helped Dr. Jacob Ashong’s audience feel less isolated and helped them to understand that they are citizens of the world, not just Ghana. Read more at ghanascienceproject.net.

The research community is inspired by the capabilities of digital systems and scientists are anxious to share their findings. This system provides a method for scientists to make presentations from their sites around the world to any community without having to leave their offices or observatories. We saw an example of this during the IYA live webcasts on the weekend of 100 Hours of Astronomy. This kind of interaction with scientists impresses and inspires students and really sparks their interest in mathematics, science and technology. I believe the ability to network with others is the wave of the future in big, small and portable domes; of course the cost for this will come down with time.

I have been communicating with Hilary McVicker about the GeoDome. When I told her I wanted to make sure all of you were aware of this unique system, she graciously sent me information to pass on to you.

About the Elumenati

She explained, “The Elumenati is a full-service design and engineering firm specializing in the development and deployment of immersive visualization environments and experiences. They provide a wide range of products, services, and research, including hardware and software design/engineering, and content production. Their production and design facilities are in Milwaukee, Wisconsin, and Asheville, North Carolina, respectively.

“The principals of The Elumenati have been designing portable dome systems since the mid-1990s at Elumens Corporation. After developing Elumsen’s VisionDome line of products for simulations, art installations, and design/engineering applications, they began to design a new generation of immersive education environments.

“From our background in designing immersive visual environments, we realized the need for robust, portable, and rapidly deployable immersive visualization tools,” says David McConville, who co-founded The Elumenati in 2002 with D’Nardo Colucci.

“They began collaborating with the American Museum of Natural History’s Carter Emmart to incorporate The Elumenati’s Omnimap spherical perspective software into SCISS’ Uniview data visualization platform. These efforts premiered at Burning Man 2004 in the Bok Globule installation, in which filled-to-capacity crowds were treated to interactive tours of the NASA/AMNH Digital Universe Atlas deep in the Nevada desert.

“Realizing the broad appeal of this approach, The Elumenati began developing portable and permanent dome theaters designed to be accessible for a wide range of audiences. The result is the GeoDome system, a highly configurable solution comprised of an Elumenati OmniFocus projection system and Omnimap-enabled software (including Uniview). While the Evolver provides a simple retrofit for existing planetariums, the Portable Theater and Portal systems take advantage of The Elumenati’s unique inflatable dome technology. The 6.5-m GeoDome Theater holds audiences up to 30 people. The GeoDomes remain fully inflated while participants enter and exit, allowing for uninterrupted immersion for the audience inside. The 3-m Portal, an open half-dome, can be placed in a forward-facing or overhead orientation.

“Both portable GeoDome systems weigh less than 300 lbs for the entire system. They can be transported in the back of an automobile or truck, and a single instructor can set up a system in under an hour. Designed to run multiple software applications through the Omnimap API, the systems enable the use of different OpenGL and DirectX applications.

“Instructors are trained in full-day sessions, and continuing user support is available from both The Elumenati and SCISS. Additionally, The Elumenati has created an online social networking system for GeoDome users that allows them to collaborate and support one another. Users can contribute their experiences on logistics like setting up and taking down the systems, post articles on diverse topics like science education and the effectiveness of immersive environments, and share ideas about grant opportunities and business models.”

As of April 6 there were 58 members, 52 photos, 9 videos, 53 discussions, 10 events and 14 blog posts.

This is a good beginning and it will grow as it addresses the specific needs of users of this projection system. Contact Information: www.geodome.info, hilary@elumenati.com or info@elumenati.com.

Later, Hilary told me about a GeoDome pilot program that began in Minnesota more than two years ago and has been led by Joel Halvorson since its inception. She suggested that I speak with Joel about his experiences with the system.

When I contacted Joel, he explained “We call our GeoDome an ‘ExploraDome,’ and we travel around to schools in our state. This dome is our outreach program for our new state-funded planetarium which will be built in downtown Minneapolis.”

The new planetarium is scheduled to open in 2012. Joel told me that because of delays in building the science center and planetarium, the portable system became a tool to market and sustain interest and momentum for building the stationary dome and science center. To date they have had 50,000 visitors, with 36,000 students having experienced a lesson in ExploraDome. Since the ExploraDome is so
of the oldest passions of humanity, we encourage scientific thought, technological advancement, and exploration.”

The ExploraDome website is an example of excellent preparation and marketing. Take a peek and see what a professional job they have done in posting information about visit requirements, program costs, a calendar for booking a visit, contact information, a rental agreement and pre-visit materials for teachers and students for each of seven different lessons. All of their lessons are designed to address the science standards for their state.

They also use a survey tool to evaluate and to market their program. They ask teachers to go to their website and fill out the survey. Teachers have responded well to this request. Possible funders are directed to a password-protected link to read the teachers’ comments. This is a way to illustrate to funders that their money is being (or would be) put to good use. The site: www.mplanetarium.org/exploradome.htm.

During my conversation with Joel, I realized that he and I were basically “on the same page” in feeling that the presenter/teacher is the key to any successful presentation and Uniview is a tool for teaching. He feels that a digital system does not, by default, make the presenter “just a projectionist.” He feels that digital systems are powerful tools to be used thoughtfully by well trained presenters who provide a fully interactive experience to their audiences.

Background in education

Joel has been a high school mathematics teacher, an education technologist at a science museum, and presented all of the lessons in the planetarium during the initiation of the Minnesota GeoDome pilot program. He now is the program director and Sally Brummel has taken over as the education outreach coordinator and presents most of the lessons. Joel credits Sally with the ExploraDome page of their website.

Joel explained that while working as a planetarium presenter he developed his programs as if they were a “nature walk through space,” where students were able to observe things along the way and ask questions. He found that by inviting them to observe in this way they gained a different perspective of where they live and their place in the universe. He found that in his experience no two classes were the same because each lesson was so interactive that students generated their own questions and opened new avenues for learning.

When I asked if he saw any negatives to his work with the planetarium, Joel shared a concern that all planetarians have. He wonders if the experiences he provides truly inspire people to go out and look at the real sky. If not, he feels that he is not doing a good job. He wonders what researchers can do to inform all of us about whether we are reaching this goal.

Later, Joel sent me a follow-up email in answer to some of my “techy” questions.

He wrote: “What makes this system so unique, and how is it different from other portable systems? Well, in a nutshell, the ExploraDome is an immersive learning system that uses the data scaling software known as Uniview. This software was initially developed as a spin-off of the NASA- and NSF-funded Digital Universe project and an academic collaboration between the American Museum of Natural History (AMNH) and Linkoping University in Sweden. This effort has now formalized into the software company SCISS with AMNH as providers of the core database.

“The ExploraDome version of this software is the first portable version in operation in the world. The dome, fish-eye lens, and geometry-correcting software were developed by The Elumenati. Put it all together, and we have the privilege of operating a very ‘adult’ friendly dome, that mirrors the system found at the Hayden Planetarium and other leading centers around the world.

“What makes Uniview unique is that it is built around spatially referenced data. This means it is not so much an ‘astronomy tool’ as it is a data-scaling tool. With the right data, we can seamlessly scale through real data in real time—from the edge of the universe through near real-time satellite data—down to a subatomic level. It’s a function of the data. We tell students it’s like having a map to the universe which gets better with age, or put another way, it’s like a GIS for the universe.

“To the data scaling, we have recently acquired two new, powerful enhancements to Uniview: data-streaming and dome-casting. Working with our partners in New York, Stockholm, Denver, North Carolina, and San Francisco (Continues on page 49)
NARRATED BY LIAM NEESON
MUSIC BY RICHARD FIOTICA

THE OTHER SIDE OF INFINITY
BLACK HOLES

Gobbling up audiences worldwide.

Produced by
DENVER MUSEUM OF NATURE & SCIENCE

Funding provided by the National Science Foundation and NASA
BLACK HOLES: THE OTHER SIDE OF INFINITY is a Denver Museum of Nature & Science Production, supported by grants from NASA’s Gamma-ray Large Area Space Science (GLASS) project, and the National Science Foundation. It is authored by Thomas Luce and reproduced with the National Center for Supercomputing Applications. Science advisors include Dr. Andrew Hamilton (University of Colorado) and Dr. Lynn Cominsky (Universe Space University). Distributed by Spitz, Inc. Approximate: 22 minutes. Image: © Denver Museum of Nature & Science.
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http://www.mediglobeplanetarium.com
http://www.konicaminolta.com/planetarium/index.html
(Continued from page 46)

Francisco, along with colleagues from NASA and NOAA, we have enhanced the capabilities of Uniview so that we can dynamically control each other’s domes, and simultaneously stream near real-time satellite data via the Internet.

“While this may sound very technical and cost prohibitive, it really is not, and it works very efficiently. When we do domecasting, each participating location is running a local copy of the software. To initiate a domecast, we all connect to a common server, and then we request control of each other’s system. This means that the Internet only transmits the control commands and the voice signal, while the process heavy rendering happens locally on each computer. This means that every audience that is connected is seeing and hearing the same thing, while the movements through the data remain synchronized and very robust.

“This also means that each site can have a very different set-up. For example, one site might be a group gathered around a laptop, while another group might be in the Hayden, the Gates, or inside our portable Explora-Dome. We have even tested this over a cell phone connection with a group of students in a school in Cambodia gathered around a laptop.

“On the data-streaming front, Uniview now has the ability to read Web Map Servicing, or WMS, data servers as well as GIS data, and data stored in the now open standard KM format. Now, as a matter of course, we travel with students out to the edge of the WMAP, and when we return, we look at the most recent (within 24 hours) NASA MODIS Global Mosaic of the earth, as we fly down to the rooftop of the school we are visiting via 15m resolution Landsat imagery. If the lesson warrants, we might even look at current carbon monoxide distribution from MOPPIT, Sea Surface temperature from AVHRR, or chlorophyll concentration from Aqua/MODIS.

“Combine this with a GIS layer showing watershed, political boundaries, or drift buoy paths in the arctic, and the guided inquiry is endless. What is perhaps most compelling about all of this is that we are able to break through artificial scientific barriers, and put all topics in a proper contextual place and scale. Quite literally, we can seamlessly travel from10^20 down to 10^-20, and our audience can be PHD physicist or pre-schoolers.

“Everyone is able to view the same data and learn at an age and knowledge appropriate level. There is nothing about cosmology as a topic that should make it out of reach of a fifth grader, except for our ability to provide a proper visual reference. Once barriers are removed, there is no end to what people can learn, appreciate, and comprehend.”

Global Domecast Celebrates Launch of International Year of Astronomy

The Elumenati supported another international domecast on January 15 to kick off 2009 as the International Year of Astronomy. From the American Museum of Natural History in New York, Carter Emmart used Uniview to explore what we’ve learned in the 400 years since Galileo picked up a telescope, and the radical shifts in worldview these discoveries continue to inspire.

The show was translated in real time for an audience at the Parque Explora in Medellin, Columbia, and crowds of all ages braved the freezing winter night in Minnesota for the event.

This domecast represents the GeoDome network in action again: “interactive discovery on a global scale.”

6th European Meeting of Small and Portable Planetaria

If you do not have dome-casting capabilities you will still have to travel to network with colleagues! Don’t wait any longer; for more information and to register go to www.chorzow2009.ajd.czest.pl or contact Tomasz Kisiel (t.kisiel@ajd.czest.pl) or Stefan Janta (Stefan@planetarium.chorzow.net.pl).

(Images from Wikimedia Commons)

Six Degrees of Black Holes

There’s a silly trivia game in the U.S. called “Six Degrees of Kevin Bacon,” in which players try to link any actor through film roles to actor Kevin Bacon. The idea is “it’s a small world.” It is, indeed, and I can link black holes and Les Miserables. The Irish actor Liam Neeson is the narrator for the Denver Museum of Science and Nature’s Black Holes: the Other Side of Infinity. Australian actor Geoffrey Rush narrates the Melbourne Planetarium show Black Holes: Journey to the Unknown. Neeson and Rush starred as antagonists Jean Valjean and Javert in the 1998 movie version of Les Miserables.  

(Images from Wikimedia Commons)
I watch a lot of planetarium shows, and now that this column has gotten underway, I’m watching a lot more. I enjoy it. I think planetarium shows are a wonderful and unique medium for engaging students and audiences and presenting astronomy-related concepts (but not only astronomy-related concepts) in effective, immersive, and (hopefully) interactive ways.

It’s with this goal in mind that I’d like to offer three suggestions to planetarium show producers. These are simply a few things I’ve noticed common to several of the shows I’ve viewed that I humbly submit for consideration. (I emphasize humbly because I have very limited experience in production myself. I offer these as a viewer alone.)

Planetarium shows are not movies

I think we all agree on this. They’re something different and they are something that hopefully leads into a live presentation, star talk, and/or opportunity for audience questions. While I understand that there’s a place for pushing a button and having an audience view a show and leave, it would be wonderful to have versions of shows edited in such a way as to make them more conducive for leading into a live presentation.

In other words: why not move the credits to the beginning? If they are done in a creative way (see Clark Planetarium’s Secret of the Cardboard Rocket) they certainly don’t have to be boring, so why not get the audience to watch them? We want to give producers credit where credit is due, but it’s hard to watch a show that ends—as many do—on an inspirational note, practically begging the audience to ask questions or priming them for a tour of the night sky, only to have to sit through two minutes of slow music and credits before starting a star talk. It ruins the mood, and it would be so simple to fix.

Please decide whether or not to use metric units

We’re science educators, so we know the importance of using metric, but we also know the colloquial “grasp” the public has on standard/British units (at least in the U.S.). I personally would prefer to see all units given in metric, but baring that could they at least be given in metric and standard? I’ve always wondered, what do shows do that report the speed of light in miles per hour when distributed outside the United States?

If you can’t create a good graphic, use a photograph

Audiences want to see pretty space pictures, and Hubble and other sources make it easy to get high-resolution images of objects in space. Why then would a planetarium producer settle on a mediocre painting or graphic of a galaxy or nebula when there are so many jaw-dropping actual images to choose from?

An audience member isn’t going to understand why they saw a fuzzy, painted image of the Orion Nebula at the culminating portion of the show when they can walk out into the lobby (or go on the internet) and see a breathtaking Hubble image.

The above are, of course, simply personal opinion and suggestion. I’m open to feedback, dialogue, and points of rebuttal.

If you’re interested in having a planetarium show reviewed please don’t hesitate to contact me. Also, all of the shows in this issue were reviewed in full-dome format because that’s simply all that’s available to me. If you have a traditional system and would like to write a review of a show you’ve installed, please let me know.
tion of “bad science” in culture today, touching on the dangers that can arise from this.

From a creative standpoint, the show makes good use of a mix of video, slide images, and fulldome sequences. Of the fulldome sequences, the closing scene was perhaps the most disappointing. Dr. Plait discusses the wonders of real astronomy in a well-spoken conclusion, but I felt the galaxy/solar system fly-through simply isn’t up to par.

Also in regards to creative effect, it’s obviously very difficult to forgo the impressive sound effects of planets whooshing by in space. However, when a show has just gone to lengths to explain that there is no sound in space, to feature that familiar thrum as each planet passes by during the closing sequence seems a bit problematic to me.

I felt there was one other instance of disconnect between “good astronomy” accuracy and “bad astronomy” visualization. In the discussion on the asteroid belt, the narrator explains the incredible distances between asteroids and the fact that they’re not actually clustered together as portrayed so often in movies. However, the visual displayed while this explanation is going on not only features a familiar tight, clustered belt, but it also shows bloated planets crowded together around a tiny sun. Visualizations speak louder than words. It’s self-defeating to explain the vast distances in space and then have a visual that is grossly out of proportion.

In all, aside from the complaints outlined above and some cornball humor, Bad Astronomy is an excellent, engaging show. What’s more, it’s specifically aimed at topics that so often muddy the waters when we open our domes to the public and has the goal of bringing clarity—something we certainly need today.

(Continues on page 52)

More About: Bad Astronomy

Bad Astronomy: Myths and Misconceptions combines straightforward explanations and humor to address the serious topic of science and culture. Phil Plait, the “bad astronomer,” is skilled at connecting with the general public. His keen sense of irony allows him to tackle controversial issues (i.e., astrology, homeopathy, etc.) and he easily demonstrates that the sciences carry far more excitement and mystery than any pseudo-science. He notes, “As a scientist, I know a place where the sun never sets. It’s a mountain and it’s on the moon. It is so high that even as the moon spins, it’s in perpetual daylight.” One certainly leaves the show inspired by the progress of science.

Bad Astronomy has been received positively by a large portion of our public audience. The show addresses four main topics: UFOs, the Moon Landing Hoax, Movies: Sound in Space, and Astrology. The only criticism that can be offered is that at just over 45 minutes and with four main topics, the show perhaps suffers from a lack of focus. It, therefore, does not easily hold the attention of audience members less familiar with the sciences. This small issue can be easily remedied by reducing the amount of time spent on some of the lengthier topics. Despite this, however, we are quite happy with the show and have extended it into our summer schedule. We expect the show to do even better with school groups. Perhaps the best summary of Bad Astronomy is Phil Plait’s final moving remark: “No crystal balls, no aliens, no horoscopes. Welcome to science—you’re going to like it here.”

Maegan C.M. Gilliland
Lakeview Museum Planetarium
Peoria, Illinois, USA

★★★

The Detroit Science Center’s Bad Astronomy, the traditional program, has been running in our theater for almost three months as of this review. The show has been playing as both a general public show and as a school offering seen mostly by 6th grade classes and some high school classes. General audience reaction to the program has been positive with very few negative comments, to my knowledge.

The few negative comments I have received all seem to deal with what has been perceived as a bit of preaching on the part of Phil Plait in the closing segment of the program. We have had numerous good comments, including a few individuals who felt the show should be required viewing for most people to understand what science really is.

I feel the strengths of the show lay in its ability to show the fallacies of UFOs, the Moon landing hoax, bad science in movies and the nightmare that is astrology. These main points are debunked well and the show makes good use of humor, especially in vignettes, to help debunk other frauds such as star registries.

The visuals for the program overall are well done. We did find that we needed to recreate some of the text slides because they were in a very deep blue that did not show up well on the dome with slide projector lamps set to full brightness. The video was certainly nicely done and worked well on our dome. The show package materials were also well put together.

There are a couple of mistakes within the soundtrack that are somewhat humorous and some audience members do catch them and make comments. The most common one is when Phil talks about seeing a flock of ducks at a shuttle launch and the sound is clearly that of Canadian Geese. The other one that not many catch is that immediately following the segment on “sound in space,” we get the “flight in space” segment and when the LEM fires its thrusters... we hear the sound. I guess sound in space makes for better planetarium experiences as well as better movie experiences.

Rick Greenawald, Manager, Faulkner Planetarium
College of Southern Idaho
Twin Falls, Idaho, USA

June 2009

Planetarian
Black Holes: The Other Side of Infinity

- Denver Museum of Nature and Science
- Running time: 25 min.
- Fulldome
- Audience: General public, middle school and older
- Contact: Mike Bruno at Spitz, +1 610-459-5200 ext. 73 or mbruno@spitzinc.com
- www.spitzinc.com/fulldome_shows

One of the most exciting things about astronomy education is the way that observational astronomy, computational theory, and creative visualization have come together in recent years. It is now possible to teach about astronomy topics using graphics that are accurately based on theory and observation and are visually compelling and engaging. A planetarium show that takes full advantage this sort of development is Denver Museum of Science’s Black Holes: The Other Side of Infinity.

It certainly helps that the show is narrated by Liam Neeson and that it deals with a topic most people find intriguing. While I’m not sure how one might evaluate the statement that the audience is on a voyage into a black hole, that particular simulation and the others with which the show is filled truly are spectacular.

Impressive and apparently accurate visualization is the strength of the show. Besides traveling into a black hole, the show includes visualizations of gravitational lensing, the way in which a massive body warps spacetime, the scale of a red supergiant compared to a star like our sun, colliding galaxies, and a trip through our galaxy to the galactic center and the black hole lurking there. I found this last visualization perhaps most effective.

My complaint with the show was that sequences like those described above certainly whet the appetite, but the content of the show itself left me wanting more. At clocking in at just over 22 minutes (plus about a minute of rolling credits at the end), the show felt more like an elaborate trailer for an incredible show about black holes than it did a show itself.

A visualization of a collapsing red giant star painted stellar evolution and death in the broadest strokes possible, and replacing vague phrases about stars rebounding into supernovae and resulting in black holes with just a bit more explanation would have made the show richer in scientific content.

In all, this is a good show that wonderfully showcases the potential for visualizing the difficult-to-imagine. Audiences will certainly leave with plenty of questions, but that’s probably a good thing.

The show is suitable for high school and adult groups and could easily lead in to discussions on stellar and galactic evolution, cosmology, relativity, and a wide range of other topics.

More About: Black Holes

I definitely think Black Holes: The Other Side of Infinity is the best planetarium show we have, and one of the best I have ever seen in terms of both entertainment value and scientific content. Audiences also seem to respond well to it, and ask a lot of questions afterwards, which is a sign that they are engaged by the material.

As someone whose research is in gravitational physics and cosmology, I appreciate the sheer amount of scientific information that went into this program.

Matthew Francis, Director
M.D. Anderson Planetarium
Lambuth University
Jackson, Tennessee, USA

Black Holes: The Other Side of Infinity was the program we picked to introduce fulldome to our audiences more than three years ago and it has remained a favorite with them ever since, both with the general public and with high school classes.

Although I would have loved to have had more information in the program itself (As Oliver Twist said, “Please, sir, may I have some more?”), I use it to lead into additional discussion after the program, specifically on the lifestyles of stars, hydrostatic equilibrium, the creation of the elements in different types of stars, and, my favorite, how we wouldn’t be here if stars had not died. Often the discussion leads to more questions about life and death in the universe and if Earth is in danger from a black hole.

This program also does something I rarely see, which is to bring people back for a second and third viewing. The people who have revisited tell me that they learn more each time they see it.

Sharon Shanks
Ward Beecher Planetarium
Youngstown State University
Youngstown, Ohio USA

The Swift Telescope, capturing a gamma-ray burst, from Black Holes: The Other Side of Infinity. © Denver Museum of Nature & Science
THE POWERHOUSES OF THE UNIVERSE

STARS

NARRATED BY MARK HAMILL

Funded in part by SunTrust Bank
Orchestral music performed by The Nashville Symphony

www.SudekumPlanetarium.com
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The International Year of Astronomy is in full swing, and we offer a sampling of some books you might want in your gift shop or library.

Thank you to reviewers Francine Jackson and Sharon Shanks.

Science, Evolution, and Creationism
Reviewed by Francine Jackson, University of Rhode Island Planetarium, Rhode Island, USA.

Several years ago, I found myself teaching 7th grade science in a religious school. Everything was working fairly well until we got to the chapter on evolution. One of the boys in the back raised his hand, stated that he was taught that the world was created 5,000 years ago, and nothing in this science book was going to convince him otherwise. Of course, all the others in the class sided with his opinion, and nothing would cause them to read or even listen to this section until a religious instructor came into the classroom and told the children that, even though this chapter contradicted everything that their religion taught, and even though they don’t believe any of it, because some people do, they were expected to at least hear about it and understand it for the fantasy it is. Why wasn’t this book around then?

Science, Evolution, and Creationism is very short, consisting of only three chapters and a one-page conclusion, but the list of reviewers shows that this will answer any questions anyone of any age could come up with. From professors of medicine, mathematics, science, ethics and religion, to paleontology, anthropology, and communications, every discipline is covered. At the end of the book come Frequently Asked Questions, especially with respect to the science/religion controversy.

Each chapter concentrates on one aspect of evolution. Chapter One’s “Evolution and the Nature of Science” introduces the discovery of fossils that transition between water and land animals, dated from 375 million years ago. Chapter Two’s “Evidence for Biological Evolution” begins, not with traditional biology, but with the origin of the cosmos, the expansion of the universe, and the constant discoveries of new stars and planetesimals.

And, if the first two chapters don’t convince you that evolution isn’t a fact, Chapter Three gives us “Creationist Perspectives,” a step-by-step treatise of both creationism and intelligent design and the fact that neither is supported by scientific evidence.

Throughout the book, highlighted words are defined in the margins; pictures and sketches clearly help the reader with understanding, such as the example of homologous structures (i.e. our arm, a dog’s foreleg, a bird’s wing). The only diagrams I found confusing, probably because I’m not a biologist, is the “V” graphs of varied species with respect to time; I’m too used to the regular X- and Y-axis format to be comfortable with this use of a new type of time diagram.

For all of us, especially in this day and age, Science, Evolution, and Creationism should be within easy reach. Sorry to say, it will probably become one of the most-used books on your shelf.

Beyond Earth: The Future of Humans in Space
Reviewed by Francine Jackson.

These Apogee Books are really great! Each one zeroes in on a specific aspect of our future in space, and tries to answer every question and quell any doubt we might have if, in fact, we do venture outward and outward. Beyond Earth consists of 36 separate sections, each dedicated to solving a problem that might arise should we try to leave the comfort of solid ground. For instance, Frank White’s “The Overview Effect and the Future of Humans in Space” begins with our original motivation to seek space—the Space Race of the ’50s and ’60s—and the result of cooperation over competition in exploration. And, once we do start a massive assault on space, two authors give us their views on the psychological implications we might face.

Is anyone worried about bacteria and its implications on health in space?  Eshel Ben-Jacob stresses the need to understand the changes and challenges that bacteria pose during our space adventures, and what we can do to “tame” the problem.

Never has a book about space exploration concerned itself with the roles of music and art with respect to space exploration. Not only does editor/author Bob Krone begin his argument with a list of some of the plethora of space-related music available today, from Holst’s The Planets to The Tornados‘ Telstar from the 1960s. And, of course, is there anyone who can’t come up with a list of space artists? Or science fiction writers? Krone uses the art of yesterday and today and compares that to what might be accomplished by someone on the outside looking back.

This book was conceived by members of the Aerospace Technology Working Group, an organization dedicated to the “principles of collaboration, teamwork, learning, and the positive uses of space for the benefit of all humanity.” With a group of people who have such a belief in the potential and possibilities available once we leave the comfort of our Earth, we should all be ready to contribute to the furtherance of space travel. This book is more like a manual of what life could be, if only we took the chance. Hopefully, more people will find this book and read it, and announce that they are, indeed, ready to travel beyond Earth.

Stargazing Basics: Getting Started in Recreational Astronomy
Reviewed by April Whitt.

This is a great book to recommend for the International Year of Astronomy. The author spent a number of years as an “armchair astronomer,” reading about science and acquiring a general knowledge of the universe, but not really knowing the night sky or owning a decent telescope.
That changed during a summer nature camp for urban students. The purchase of a small spotting scope enabled Kinzer to show the moon “up close” during an overnight camp-out, and the kids were thrilled. After the students were asleep in their tents, the author began aiming the scope at sections of the Milky Way, and then at a bright yellow star.

He writes, “I was not expecting much; stars are so far away that they appear only as sharp points in even the largest telescope. But this “star” had rings; I was looking at the planet Saturn! I had no idea that so small a telescope could show it so clearly; and I had just stumbled upon it, like a jewel on the beach. Well, that was it. I was hooked.”

This guide is the result of his “aha!” experience and subsequent work with telescopes and the general public. In about 150 pages, he describes what can be seen with the eye alone, how to use binoculars, how to answer the “But I want a telescope!” inquiry, and gives an overview of both solar system and deep sky objects.

Chapter One, “With the Naked Eye Alone,” is a basic description of the whole night sky. He discusses the celestial sphere, dividing it into solar system and deep sky objects. This is important, he says, “Because it means we can make maps of the deep sky, and that these maps can be used for decades to find interesting and beautiful things to study. But finding objects in the Solar System must be done differently, since they change position so quickly.” A short section about constellations is followed by web and print resources.

Binoculars are the next step in Chapter Two. There is a great list of the advantages of binoculars on page 18, including the point that they show a correct image. I’ve had a number of people looking through the eyepiece of our big telescope ask why the moon is upside down.

Chapter Three discusses choosing a telescope. Three main factors are detailed: cost, “size,” and ease of use. Aperture vs. focal length, magnification limits, sturdy mounts, eyepieces and filters, and reflector or refractor information is accompanied by excellent black and white photographs and “more info” boxes of text set out for easy reference.

The second half of the book describes “What’s Up There?” The author cautions the reader not to expect “to see things as they appear in books or magazines, or on television or the internet.” He reminds us that “stargazing takes practice, like any other skill.” This section includes tables of when to observe the planets (from the present to the year 2020), diagrams of moon phases, and a list of meteor showers. Stars and galaxies are in the “deep sky” section.

The author is careful to state what this guide is: a starting point. There is enough information for just about anyone to get started in stargazing. An excellent glossary defines terms printed in bold face throughout the book. Appendices include the Greek alphabet, constellation names, and some simple star charts.

He also emphasizes what this guide is not: a complete guide. Other resources provide more detailed sky charts, or more information on equipment buying, or better star maps to take into the field. This is a simple tool for beginners, and it’s an excellent one. And it’s one of the prizes during our National Astronomy Day festivities here at Fernbank.

Women Astronomers: Reaching for the Stars


Mabel Armstrong is a retired science professor who has collected the stories of women astronomers past and present in this easy-to-read and attractive volume. Twenty-one astronomers, from EnHeduanna to Jill Tarter and another 15 “rising stars,” are featured.

The book is arranged chronologically, and a time line runs across the bottom of the pages, from 4000 BCE with “Egyptians use a 360-day calendar divided into twelve months of thirty days each” through 1994 when “Comet Shoemaker-Levy collides with Jupiter.”

While I was familiar with the work of Annie Cannon, Henrietta Leavitt, Maria Mitchell, Nancy Grace Roman, Vera Rubin, Margaret Geller and Sally Ride, this book provides a deeper view into their achievements and struggles. And it introduces dozens more astronomers. For you trivia buffs out there, Winnifred Edgerton was the first woman to earn a doctorate in astronomy, in 1886, and the first woman to earn a degree from Columbia University. She was admitted with the proviso that her admission “established no precedent for others.”

Caroline Herschel is here, with her comet discoveries and careful record keeping (melting ink over a candle flame when temperatures dipped below freezing). So is Maria Cunitz, who published a volume of astronomical tables in 1650 based on Kepler.

Throughout the book, the astronomers’ struggles with current thinking, social mores, and less-than-supportive administrators are balanced with the joy of discovery and delight in teaching students and sharing new knowledge. Sidebars discuss the electromagnetic spectrum, Cepheid variables and stellar distances, optical telescopes, redshift and physical constants.

I would take exception with only a few statements. On page 30, a sentence states that “the phases of the moon predicted the tides...” and on page 77 the “streak of bright light across the sky” is Halley’s Comet, according to Helen Sawyer Hogg’s father. Overall, though, the book is highly recommended. An excellent glossary, references for each chapter, a complete index, and beautifully placed illustrations and photos make this a good choice for libraries, museum shops, and gifts to young people.

(Continues on page 59)
INTRODUCING A COMPELLING NEW PLANETARIUM SHOW FROM THE ISLAND OF HAWAI'I

With unique access to their facilities and in cooperation with the PIs, this first in a planetarium series for general audiences showcases the latest discoveries from three major international telescopes. Voyage into Subaru, Gemini, and Canada-France-Hawai‘i observatories to explore exoplanet TRES-1, real-time observations of the galaxy SN2008D, and the One Square Degree Survey. Featuring stunning time-lapse footage and astro simulations rendered in DigitalSky 2. Produced by Sky-Skan for ‘I‘imoa Astronomy Center of Hawai‘i.

Available exclusively from Sky-Skan in both 3D stereo and standard 2D mono fulldome formats.
Contact Sky-Skan distribution at +1 603-880-8500 or e-mail sales@skyskan.com. Visit SkySkan.com/shows
Get ready for the Big Whack

New for fulldome systems, GeoGraphics Imaging has released new animations, including a new moon formation sequence that depicts the hypothetical Mars-size body Theia colliding with early Earth and the scientific hypothesis for the formation of the moon. For more information, contact George Fleenor at GeoGraphics Imaging, 7803 25th Avenue West, Bradenton, Florida USA 34209, phone +1 941-920-0246. www.geographicsimaging.com

Touching the Edge of the Universe

The European Space Agency presented the world premiere of Touching the Edge of the Universe in May at 30 planetariums in Germany, Austria, and Switzerland. The premiere came just days before the launch of Herschel & Planck, two of the show’s starring missions, scheduled for 14 May. The fulldome Touching the Edge of the Universe tells the story of astronomy from the time of Galileo and his simple optical telescope to today’s sophisticated space astronomy missions. For more information, go to: www.planetariumshow.eu.

SUPER MEDIAGLOBE II

Konica Minolta is pushing the envelope in high-resolution projection (4096x2400 pixels), four times more pixels than the best HDTV image and a native contrast of 10,000:1. Ultimately, it is the projection lens that determines quality of the image. Konica Minolta reports it has developed a unique fish-eye lens using their famous optical design and fabrication technologies. The SUPER MEDIAGLOBE II began a special demonstration tour of the US in May; Please visit www.av-imagineering.com/sm2_tour2009.htm for a location near you. For more information, please contact Joanne Young at +1 407-859-8166, joanne@av-imagineering.com, or visit www.mediaglobeplanetarium.com/super2.htm.

Sky Touch from Sky-Skan

Made for Definiti theaters and exhibits, Sky Touch Forecast permits the operator to inject colored dye into a rendition of Earth’s atmosphere. A forecast of the winds at three levels in the atmosphere then pulls the dye just as if it were pollution from a factory, ash from a volcano eruption, or any other airborne particle. Teaching about the jet stream, changing weather patterns around hurricanes, and studying global weather patterns are all potential applications. Sky Touch is free with the new Release 2 of Definiti software (DigitalSky 2 v2.2). Sky Touch Forecast is based on FloVis technology, a collaboration between Sky-Skan and the University of New Hampshire. View a Preview of this technology at www.youtube.com/watch?v=O4rj9vV7XNQ.

(Continues on page 59)
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 of resources it makes available to its partners. The IYA2009 trailer is for instance available in 43 languages, as well as in full-dome format. This is a unique resource for planetariums and science centres.
GOTO goes green
Chronos II is the world’s first star projector to be illuminated by LED (light emitting diodes). According to the company, the new projector will consume about a third of the electrical power of the CHRONOS and also will generate less heat and thus requiring fewer and slower running fans. The LEDs are estimated to have 10,000 to 30,000 hours of use life. Chronos II has been designed to operate in domes from 7.13 to 15.25 m (24-50 ft) and to function with a synchronized Evans & Sutherland Digistar fulldome video system. Both systems are controlled by a single console. For more information, contact GOTO at 4-16 Yazaicho, Fujuchu-shi, Tokyo 183-8530 Japan; phone +81-42-362-5312; e-mail info2@goto2.co.jp, or the GOTO USA Liaison Office, 346 Ilomano Street, Kailua, Hawai'i 96734; e-mail GotoUSA@earthlink.net

Another Definiti product: Interact!
Sky-Skan has been working with the Lawrence Hall of Science (LHS) at the University of California, Berkeley to reinvent the LHS PASS (Planetarium Activities for Student Success) teaching modules for digital theaters. Each Interact! module is a faithful update to the topics created to teach young people the basics of astronomy. Rather than a simple playback show, you also get before and after the dome presentation workshop activities. The modules explain how a live presenter should take the students through each concept—often using physical visual aids. The entire Interact! package is easy to install into a Definiti theater; as the modules are completed, new theaters will have the modules installed automatically. Interact! for Definiti will be free for new Definiti theaters, and there will be package for non-Definiti theaters that will allow them to have all the assets in digital form to assemble the show for their particular system. Interact! is scheduled have the first modules available this summer.

For more information, contact Sky-Skan at 51 Lake Street, Nashua, New Hampshire 03060 USA; +1 603-880-8500, USA toll-free 800-880-8500; email office@skyskan.com; www.skyskan.com

(Continued from page 57)

People and the Sky: Our Ancestors and the Cosmos
Reviewed by Sharon Shanks, Ward Beecher Planetarium, Youngstown State University, Youngstown, Ohio, USA.

People and the Sky does for understanding the roots of astronomy what Jared Diamond’s seminal Guns, Germs, and Steel (W.W. Norton & Company, New York, 1999) does for understanding the roots of civilization. Diamond helps the reader understand, for example, how Earth’s geography and weather patterns are among the reasons why the first civilizations started where they did and why they flourished.

Dr. Aveni’s book helps the reader look at humans’ first understanding of the sky and how people struggled to find meaning in what they saw, a learning experience that led to religion and science.

Before technology and a change in the way that we view nature separated us, the sky was intimately relevant in human lives. We have never accepted the idea that there can be something from nothing, and seeing the patterns and rhythms of the sun, stars and planets gave rise to the first creation myths that provided the instrument, the action, or the source of everything. In other words, interpreting what we saw in the sky led to the first deities.

Another uniquely human characteristic—the need to find order, meaning, and patterns from chaos—worked hand-in-hand with our search for a source of everything. Not only did we need a source of everything, we needed the reason why.

Aveni organizes the book in the order of the sky’s earliest users. He begins with the storytellers, who were among the first to use the sky as a backdrop to creation myths. Not only did these myths explain where we came from, but also served as a prescription for living ordered lives. These shared stories bonded people together and set up the rules for order, so necessary for nascent civilizations.

The patterns in the stars arrived later. The first constellations probably were very personal and regional, changing as the needs of the group, tribe, or village changed. As civilization grew, the patterns became deliberate, as a way or remembering figures with religious and mythic significance. (This also might explain why so many constellations don’t resemble what they’re supposed to represent.)

Aveni notes that patterns in a verbal society became a means to order chaos and guide behavior. We do the same today through books, television, and the internet.

The importance and significance of the sky continues through chapters focused on sailors, hunters, farmers, the house and family, the city, the ruler, the astrologer, and the timekeeper, and an additional chapter is devoted to the Western sky.

For me, the most important chapter is the epilogue and the message that understanding how things came to be is remembering that people and knowledge change with time. “They are not us,” Aveni reminds us. I keep this in mind when I teach constellations, not to mock our predecessors but to admire them for their careful observations and overwhelming desire to understand the universe.

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(Continued from page 55)
Thomas W. Hocking (St. Charles Parish Planetarium, Louisiana) describes the collaboration of two Louisiana planetariums to produce a show on a 3,000-year-old local archaeological site with astronomical meaning.

Elizabeth Wasiluk (Florida’s Bishop Planetarium) did a study of planetariums that were then using the Starlab Portable Planetarium. (Viewlex also had a portable at the time. No one seems ever to have studied their use.) She knew of 19, of which 12 responded to her survey.

Six were associated with permanently mounted planetariums. Study topics were background of those using the portables, and topics covered in shows. Staff experience ranged from one to 11 years. Topics covered, in descending order of frequency, were stars and constellations, seasons, Greek and Roman mythology, American Indian myths, and day and activities of RMPA, SWAP, SEPA, and GPAA. In Computer Corner, John Moseley described a number of orrery programs then available.

### Surveying prior knowledge

Sheldon Schafer (Lakeview Planetarium) surveyed students at two colleges who were registering for introductory astronomy to see how much they knew before starting the course. There were 25 elementary questions to which he shows the percentage of correct answers, and in some cases the most popular wrong answers. The most appalling of the results was that fifth graders got 56% correct, and so did the college students before taking astronomy!

Gerry Mallon offered a show on Polynesian astronomy and navigation techniques, such as using an alignment of Epsilon Canis Minoris and Pollux to sail from the Solomon Is-

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### Technology and poetry

Elissa Malcom (Wagner College Planetarium, Staten Island, New York) wrote on planetarium technology and astronomical poetry. Quotes from works by Diane Ackerman are contrasted and paralleled with planetarium effects and scripts. In some cases this works to enliven otherwise pedestrian talk, but elsewhere it could leave an audience confused or uninformed.

Mike Chauvin (Hawaii’s Bishop Planetarium) discusses the logic of SETI from a rigorously philosophical standpoint. He goes back as far as Metrodorus of Chios and Lucretius to show that humans have long anticipated discovery of alien intelligent life in space.

The Gibbous Gazette column was a bit skimpy as columnist John Wharton moved from Oklahoma City, Oklahoma to St. Louis, Missouri. Sesame Street characters were being used under license in the Hayden Planetarium. Minolta and Zeiss each had a new projector, with Minolta upsizing and Zeiss downsizing the intended domes. Talent was leaving the special effects field. Ownership of the McDonnell Planetarium was switched from the city of St. Louis to the museum.

Jack Dunn’s Regional Roundup reported on lands to Hawaii. In What’s New, James Brown described some books and an audio tape on sky viewing.

Jordan Marche reviewed God and the New Physics, examining “the cosmological and theological doctrines which shape our minds and lives today.”

Jane’s Corner, as usual, completed the issue. This time she had some pithy comments of third graders about a planetarium visit, and suggested that “parallax” is what you take when you are “constellated.”

June 13 had a partial penumbral lunar eclipse. The USA had three launches during the month, including an IntelSat and a KH spy satellite among five placed in orbit. The Soviet Union had 13 launches, including one manned launch. Most of the rest were in the Kosmos series.
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SEPA - June 16-20
Come to SEPA in Nashville early for a special presentation on Mayan astronomy by world-renowned archaeoastronomer Dr. Anthony Aveni and the Center for Latin American Studies at Vanderbilt University.

Dr. Aveni will use the new Sudukum Planetarium’s GOTO Chiron Hybrid optical star projector and the Evans & Sutherland Digitizer 3 to recreate important aspects of Mayan astronomy.

Skywatchers of Ancient Mexico
8:30-10:30 a.m.
June 16, 2009
Sudukum Planetarium

Since western man first studied Mayan archaeological and artistic remains about a century ago, we have begun to appreciate that the ancient Maya rulers of Central America were possessed by the study of time, calendar, and astronomy. In this lecture, we dwell mainly on the evidence that suggests Maya priest-astronomers carefully watched the planet Venus, clocking its motion to an accuracy of better than 2 hours in 3 centuries—all without the advantage of a technology like our own. What drove them to such precision? What was the observational methodology employed to follow the planet? Why was Venus, above all other celestial objects so important to Maya astronomers? What other celestial bodies were given attention? These questions are discussed in some detail along with the study of time, calendar and astronomical orientations in standing Maya architecture.

Anthony F. Aveni is the Russell B. Colgate Professor of Astronomy and Anthropology, serving appointments in both Departments of Physics and Astronomy and Sociology and Anthropology at Colgate University, where he has taught since 1963. Dr. Aveni helped develop the field of archaeoastronomy and now is considered one of the founders of Mesoamerican archaeoastronomy, in particular for his research in the astronomical history of the Maya Indians of ancient Mexico. Dr. Aveni is a lecturer, speaker, and editor/author of over two dozen books on ancient astronomy.

2009 International Year of Astronomy
4-6 June, 2009. EECITE Conference (European Network of Science Centres and Museums), National Science and Technology Museum “Leonardo da Vinci”, Milan, Italy; www.ecsite.net
16-20 June. Southeastern Planetarium Association (SEPA) annual conference joined by Western Alliance Conference (GPPA, SWAP, RMPA, and PPA), Sudukum Planetarium, Adventure Science Center, Nashville, Tennessee, USA. Contact: krismccall@adventuresc.com
2-5 July, 2009. International Planetarium Society Council Meeting, Cité de l’Espace, Toulouse, France; tom@armaghplanet.com

22 July, total solar eclipse
3-5 September. 6th European Meeting of Small and Portable Planetaria at the M. Copernicus Planetarium and Observatory in Chorzow, Poland. For information and registration go to: http://www.chorzow2009.ajd.czest.pl or contact Tomasz Kisiel (t.kisiel@ajd.czest.pl) or (tk8283@gmail.com).
4-5 September. Nordic Planetarium Association Conference, Jermuseum, Vitenfabriken, Sandnes, Norway. Chair and contact: Ivar Reed Nakken, iivar.nakken@mail.nu.
16-18 September. Annual Digistar Users Group meeting, Salt Lake City, Utah, USA. http://www.digistardomes.com
21-24 October. Great Lakes Planetarium Association 45th Annual Conference, Delta College Planetarium, Bay City, Michigan, USA. Contact Garry Beckstrom at gbeckst@delt.edu Phone: +1 989 667-2270; planetarium website: www3.delta.edu/planet; conference website www.glpaweb.org/conference.htm
31 October - 3 November. Association of Science-Technology Centers (ASTC) Annual Conference, Fort Worth Museum of Science and History, Fort Worth, Texas, USA. www.astc.org

2010
21 March. International Day of Planetaria; www.dayofplanetaria.org
April. Italian Association of Planetaria (PLANIT), XXV National Conference, Italy, www.planetaritaliani.it. Contact: osservatorio@serafinozani.it
8-12 June. Southeastern Planetarium Association (SEPA) annual conference, Kingsport, Tennessee, USA.
2-7 July. EuroScience Open Forum (ESOF), Turin, Italy, www.euroscience.org

11 July, total solar eclipse
2-5 October. Association of Science-Technology Centers (ASTC) Annual Conference, Bishop Museum, Honolulu, Hawaii, USA. www.astc.org

Deadlines for “A Week in Italy”
31 August 2009. “A week in Italy for a French Speaking Planetarium Operator”.
30 September 2009. “A week in Italy for a Spanish Speaking Planetarium Operator”.

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 osservatorio@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.ips-planetarium.org/events/conferences.html
Out of the mouths of babes

Young children are such sponges. They absorb everything around them, and are such a delight to work with.

Fernbank offers pre-schoolers a version of the Bays Mountain, Tennessee, planetarium program *The Friendly Stars*. Our artist created some images of a young girl to act as the host for the program. At one point in the program, the image is of Stella facing away from the audience, while the stars (still invisible in the day sky) are talking. She is looking up into the sky, asking where they are, and saying, “I can’t see you!”

During a recent program, at the point where the image was up and she said, “I can’t see you!” a small voice from the audience piped up, “Turn around!”

Robin Sip’s 2-year-old son doesn’t watch television, but he asks to see daddy’s *Dawn of the Space Age* program at least twice a day. (It’s a fantastic fulldome program from Mirage 3D.) Robin told us that his son “knows three words: daddy, mamma and mission sequence start!”

Happy Birthday Galileo! Retired Fernbank Astronomer Jim Summers participated in the Space Telescope Science Institute image unveiling on Valentine’s Day. Mr. Galileo answered questions from the audience, and was a big hit. Photograph by Bernard Thoeny.

Part of the International Year of Astronomy fun is working with international partners. Techniquest in Cardiff, Wales is our partner through an ASTC twinning program as part of the IYA. In this picture, a group of scouts is exploring the night sky. Photo courtesy Jane Young and Techniquest.
Dream it and we will deliver it

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