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## On the Cover

*“For those who may ask what they can do to honor Neil, we have a simple request. Honor his example of service, accomplishment and modesty, and the next time you walk outside on a clear night and see the moon smiling down at you, think of Neil Armstrong and give him a wink.”*

*“I think we’re going to the moon because it’s in the nature of the human being to face challenges. It’s by the nature of his deep inner soul...we’re required to do these things just as salmon swim upstream.”*

Neil Armstrong, 1930-2012
The Planetarian welcomes submissions of interest to the planetarium community. Preference is given to articles that closely relate to the philosophy, management, technical aspects, educational aspects, or history of planetariums, and to ideas that can readily be incorporated into planetarium shows. Authors are responsible for obtaining all necessary copyright clearances, especially for illustrations and photographs.

Research articles dealing with educational aspects of the planetarium and other topics are highly desirable and will be refereed if applicable and requested.

Contributors agree that their submission is their original work and has not appeared elsewhere in print or electronically, nor is not being submitted simultaneously elsewhere in print or electronically. If the submission has appeared elsewhere in print or electronically, permission to re-print must be obtained and a copy of this permission emailed to the Editor with the article.

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December 2012

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In this issue I’ve written a review of the movie The Ancient Astronomers of Timbuktu. We have been showing Clark Planetarium’s Skywatchers of Ancient Mexico in my dome, and while watching the movie again for the review, I kept remembering two lines from Skywatchers: “We found among them a great number of books written with their characters, and because they contained nothing but superstitions and falsehoods about the devil, we burned them all, which they felt most deeply, and over which they showed much sorrow.”

Earlier in the program, in discussing the three Maya books that had survived, “Imagine what we might know if more Maya books had survived.”

Any time I write about a topic, I do basic research. In looking for the movie’s web site, I also stumbled across news from Mali and the fact that Timbuktu is now in the hands of religious extremists.

Not that I believe everything I read on the internet (because, of course, it claims the internet (because, of course, it claims the religious extremists.

It is from www.theartnewspaper.com from June, 2012, noting that Mali has been “in a state of crisis since a military coup seized power in March.”

Concern for the cultural heritage of Mali is growing after militant Islamic fundamentalists desecrated a 15th-century tomb of a Muslim saint in Timbuktu in May, and threatened to destroy other tombs as well as anything else they perceive as being idolatrous or contrary to their version of Islam. The northern Malian city, a Unesco World Heritage Site, is home to several other such tombs and three historic mosques as well as many small museums. Timbuktu also has between 600,000 and one million ancient manuscripts housed in public and private collections that are vulnerable to acts of destruction from the occupying rebel forces as well as from those looking to profit from the political unrest.

To write my review correctly, I should have said that the ancient manuscripts are also under attack by the most pervasive of destructive factors: humans. Or, more correctly, humans under the influence of religion.

I hate to use “that” word because it is one of the two things I run away from in public. The other, of course, is politics (and, in the United States, those two words become more intertwined). OK, enough of those nasty words.

The message of the movie is upbeat: that knowledge must be preserved, and a new era of understanding astronomy in Africa has begun.

Where would the world’s science of astronomy be today if the Muslim world had not preserved that hard-won knowledge and then shared it again?

And, even though in today’s world we know the painful lesson of the Maya and their destroyed books, imaging what we might know if more Maya books had survived, it seems that people really haven’t learned a thing.

By the way, Skywatchers of Ancient Mexico was produced in 1980. This show, written by Mark Litman, retains its valid science and ability to enthrall audiences today, shown by consistent good attendance under my dome.

Speaking of research

I noted that I research before I write. That habit has been with me through college (English major), at my first positions at newspapers, and now as a script writer and editor.

That’s why I decided to devote many pages to Michele Wistisen’s master’s thesis in this issue, and, even though I didn’t print the entire paper I did include her references.

Anyone who’s done basic research knows to look at a paper’s citations and references for leads to more sources of information. The value of a bibliography, especially the prized annotated bibliography, is something often overlooked.

That’s why I look forward to Andrew Fraknoi’s annual “Good Reading from Other Sources on Astronomy Education and Outreach” in Astronomy Education Review. Well, OK, I’ll admit to checking first to see if the Planetarian is cited, but I also look for research in education journals that I probably would never find on my own. Think of bibliographies as the search engines of the pre-computer world.

Michele’s research, as is appropriate for a master’s thesis, states the question, reviews the literature and current methods, analyses data, and reaches a conclusion (to tip you off: that teaching moon phases should be delayed until high school; be sure to read the rest of her paper on the IPS website).

I have on my desk an article from the National Science Teacher’s Association journal Science Scope (their middle school science publication) from January 2011 that gives just as much space to an 8th grade lesson plan on moon phase modeling. The title is “A High-Stakes Test Intervention: Moon-Phase Models as Viewed from Earth and Space.”

The title tells the tale

The title should tip you off: the focus is how to teach for the high-stakes tests that “grade” schools and their teachers. The authors rightly suggest that what a student sees in the sky, the “3-D version,” isn’t easily transferred to 2-D concepts presented on paper on the tests, and recommend using a variety of teaching strategies, including manipulating moon phase paper plates, as intervention lessons.

After reading it, I was left, like Oliver Twist, wanting more than “teachers who taught this intervention lesson thought it engaged students and fostered creativity” and that students reported “that this activity was fun and helped them understand the Moon phase diagrams and pictures better.” Note that they did not report understanding moon phases, and I wonder how many of these students a year later can explain why the phases occur.

The three references are from curriculum and lesson design. None are from astronomy or science sources.

I’m not really cutting down the paper; it is, indeed, a lesson plan. But I see no real argument supporting that this method works, and if it does, why it works. But the paper is now out there, in the literature, waiting to be cited by others looking for research on teaching moon phases.

The planetarium community needs more research like Michele’s, and we need to make the research available to the wider educational community, either through publication in the Planetarian and/or the AER, through annotated bibliographies, and through, simply, sharing.

A paper that contains valuable information does no one a service if it’s sitting dusty on a shelf or confined to one hard drive.

There will be more on this topic in the future and on the IPS website, but for now, I’m out of space.
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When Teaching Astronomy, Keep Your Feet on the Ground

Editor’s Note:
Occasionally I feel that some submissions should be given more prominence, or that something I’ve read needs to be shared. This is one of those times.

Ray Worthy delivered this talk at the recent British Association of Planetaria Conference, held at the National Space Centre in Leicester.

Susan Button, who included the paper with her Mobile News, said “I would have loved to have heard him perform the paper in person. Yes, I mean perform, because he is one of the best presenters I have ever had to pleasure to witness!”

After reading this, I, too, wish I could have heard this talk. -Sharon Shanks

Caution: Adult language used. Keep out of reach of children, the narrow-minded, and dour people without humor

By Ray Worthy
Hartlepool, England
Retired
rayw43@virgin-media.com

When you reach a certain age, you tend to beware of a friend who sports a wallet full of pictures of grandchildren. That could be a whole evening gone! So when, some four summers ago, a friend announced that he was going to bring a favourite child to perform on our piano, I resigned myself to spending an afternoon framing polite phrases of appreciation while we listened to “Bluebells of Scotland.” Was I in for a surprise!

A boy of 10 appeared and sat down at the keyboard. A hush descended upon the company. What followed was a bravura performance of sonatas by Beethoven, Schubert, Mozart and Chopin such as would have graced any concert hall. Young Philip was a veritable prodigy who exhibited his talent with an overriding innocence.

I was in awe of this young lad and when he approached me after tea, I paid him full attention.

“Granddad tells me you teach astronomy,” he began.

“That’s right,” I answered. “Are you interested?”

“I certainly am,” he said. “Could I come round tomorrow afternoon for a session?” Ten years old and he talked like an adult. I assured him that I would be available and would be ready at two o’clock.

“Good!” he said quite formally. “I look forward to it.”

I am recording my meeting with young Philip in this detail because it paints the background to what followed that next afternoon. It turned out to be the most remarkable and rewarding teaching session that I have ever experienced.

It was a beautiful summer’s day so I set up shop outside on the patio, seated at a large round garden table. Not knowing quite what to expect, I provided myself with various props such as balls of various sizes and plenty of sheets of paper. At this particular date, my eyesight was rather poor so I could not offer photos in books. I planned to start with basic concepts and see how far we progressed.

I would have to be guided by his responses. There were times when that circular table stood in for the Earth, the sun, the Earth’s orbit, and I deployed various balls to represent planets. I kept having to remind myself that this boy was only 10.

I stayed away from mathematics, but we raided my workshop in my garage in which I kept some long cylinders of polystyrene. These were sawn up and sliced at various angles and Philip soon got a grasp of the relationship between circles and ellipses. Concept after concept, he swallowed up without batting an eyelid. Philip seemed to have no notion of how precocious he was. He brought a powerful concentration to bear on the topics I presented to him.

It was not long before we moved away from the solar system and out to the stars, the Milky Way and the galaxies. I realised that he had no idea of what light was, so I started on the atom and its constituent parts. Once again, he took in all the ideas I presented to him. The discovery of the moons of Jupiter, how the time table of their occultations led to the discovery of the speed of light and Newton’s ideas were meat and drink to this amazing boy.

Charged topics, for a child

One thing that stood out in my memory was when I was explaining how the electrons moving from one energy level to another within an atom gave rise to the emission of quanta of light at particular frequencies. Nobody had told Philip that this was advanced stuff so he just listened and absorbed it.

When I showed him the dark lines that Fraunhofer discovered in the spectrum of a star, this amazing boy suggested the correct explanation, that a cloud of cold gas came between us and the star and it contained atoms whose electrons were ready to shoot up to their previous high energy orbitals and this absorbed the light at that particular frequency. Philip just saw it as the reverse of that pattern of nature, nothing special. I had to pinch myself as I introduced him to the ideas behind some simple Feynman diagrams.

This boy was 10. At this rate, I would soon exhaust my own repertoire, so I amused him by telling him stories about the most intelligent man on Earth, when he was alive, Richard Feynman. We were still laughing over some of Feynman’s anecdotes when his granddad came to collect him.

At the other end of the spectrum

The example I have shown with young Philip presents to us something which rarely falls to us as teachers of astronomy or lecturers in planetariums. Let me show you something from the other end of the spectrum, something which more usually falls to our lot.

Thirteen years old, Jason was a member of a class in the school where I taught for 30 years.

The headmaster had seen the success of my newly-built inflatable planetarium. Indeed, he had been in it and had witnessed the enthusiasm of the pupils as they surveyed the stars going slowly about the heavens.

In his wisdom, he asked if I would incorporate the use of the planetarium into the science syllabus for the third year. In particular, he wished to encourage the more laggardly streams by increasing their stimulation. That was the theory anyway.

Jason’s class was full of pupils whom the scientific world seemed to have passed by. They were to be taught in nine-week modules because it was thought that their brains would not retain much if they had to wait until the end of the school year.

Jason had studied a course which included the works of Copernicus, Galileo, Newton and others. He had been in the planetarium at least four times.

His test paper had asked him to, “Name three famous astronomers and write a few lines showing why they were famous.”

Jason’s answer read, and I quote verbatim, “The only famous astronomer that I know is Mr. Raymond Worthy. He knows EVERYTHING!! (and this word took up the space of three lines) about astronomy.

He has even got his own crematorium.”

What creates the difference between Philip and Jason?

The most obvious answer to this question is the disparity in their IQs, the general intel-
lingence level, but in fact, there is much, much more to the puzzle than might be first supposed.

Now about Jamie

In 1962, I was a mature student at a teacher training college in Weymouth, Dorset. In one of my classes in a local school, I made the acquaintance of a boy called Jamie. Rather, I should say that Jamie made acquaintance with me because, once he had discovered that I was interested in astronomy, he followed me around. He was passionate about the subject and talked about it on all occasions when we met.

One Saturday afternoon, he saw me walking along the promenade and made a bee line for me. We walked on the beach and I took him down to where the beach was wetted by the tide. There, with a stick, we used the beach like a blackboard, discussing the orbits of the solar system.

The trouble was that he could not get his ideas down on paper. He was one of the worst cases of dyslexia that I have ever seen. I remember one of his written answers to a history paper asking what had killed Alexander the Great. Jamie had written, “He did of a moytotwwow.”

Even in his science paper dealing with astronomy, his score was almost zero.

I approached the headmaster and asked why Jamie could not have an amanuensis. His reply was that Dorset was an agricultural rural county and had no funds. They could not afford to acknowledge a boy with dyslexia.

This anecdote about Jamie serves to underline the statement that there is more to the solving of the puzzle than straightforward IQ levels. Jamie was intelligent, but could not surmount his particular problem of expressing himself in writing. When examined verbally, he showed that he had no difficulty in constructing a hierarchy of scientific concepts. He was just unable to put his ideas on paper.

Language codes

In 1974 I attended Newcastle University, where I studied in the education department. My thesis was titled “Early Cognition Processes and The Acquisition of Scientific Concepts.”

There, I got into very deep considerations indeed, but I remember rebelling against all the esoteric jargon which obscured so many articles. I shall cut this stuff out and give a concise account of what I remember.

Standing head and shoulders above the early pioneers studying the topic was a Russian who did most of his work in the 1930. His name was Lev Vygotsky. Because of the political situation prevailing at that time, Vygotsky’s work was not translated, but, after the war, his papers became available to academics in the west. There were many disciples of his work but, unfortunately, Vygotsky had died when still a young man.

Vygotsky did many experiments trying to establish the routes by which a young mind began to acquire concepts. His most famous tests involved using a special set of 16 blocks which included varying shapes, sizes and colours. Under each block was one of four three-letter words, having no meaning in ordinary English. It is only when the blocks are placed in their correct groups does the meaning of each word become apparent.

During the attempts, the words are hidden by being underneath the blocks. After each attempt at placing the blocks in their appropriate groups, the tester turns over one block in each group to reveal the word underneath.

A subject who possesses a logical mind can see the ev-idence and act accordingly, and in a few attempts arrives at the logical conclusion and can state the meaning of each word. Some people, whom many would categorize as intelligent, are seemingly completely unable to finish the task, no matter how often they try.

Believe me, I do understand that absorbing exactly what I have described is not easy and I sympathise with you. What I advocate is that you get the instructions from the web or me and you make yourself a set of these blocks and carry out the exercise with some volunteers who have never done it before.

I made myself a set of these “Vygotsky’s blocks” and tested all and sundry. Only a certain proportion showed what we could call scientific logic in their adopted method. Some subjects, and I included many teachers in my victims, whilst to all intents and purposes appeared to be “Intelligent,” could not, for the life of them, use a logical process. This inability appeared to be deeply intrinsic in their character. I came across many surprises. Today, it is possible to witness some of these tests being carried out on Google.

Limited language use

Vygotsky investigated the reasons why many people could not follow a logical progression of concepts. The main thrust of his later papers was that he considered that the early use of a kind of limited language used in particular social groups was the cause. As Vygotsky put it, “Higher mental processes in the individual have their origins in their social processes.”

Sometime around the year 1970 an East London social worker called Basil Bernstein developed a similar theme. He noticed that in a social clinic there was a distinct difference between the language of the staff and the language of the clients. In the language of his clients, there seemed to be what Bernstein described as “An understanding within a mutual context.”

I have investigated this idea among the folk in the North East, and I am sure that Bernstein’s ideas had a basis in fact. Unfortunately, his choice of nomenclature does not help in clarifying the situation. He called the two language codes “elaborated” and “restricted.” Many people took this to mean upper or educated class and working class. This blurring did not help the situation. Political attitudes were triggered off and tempers flew.

It was supposed that the classification of “elaborated code” meant the kind of language and thought which was so explicit in the meaning of items and concepts that to move from a lower concept level to a higher one was relatively easy. The users of the so-called “restricted code,” however, were operating within a section of society in which the points of reference within a community were not only shared but assumed to be the same, both in the speaker and the listener.
If you Google under the heading Basil Bernstein, you will find many examples of the use of the restricted code. It is in common use in my home town and indeed in Tyneside, and I have no doubt it is common elsewhere. I have heard many conversations ending in the sentence “you know what I mean,” or variations on that theme. It is so common that the sentence is often reduced and shortened almost into one continuous sound.

Reducing vocabulary

This reduction of vocabulary to the level where they have meaning only in context is often taken into the extreme by the included use of words which in other contexts are well known swear words. Let me give you an extreme illustration.

The scene was a pine wood in northern Germany in 1951. There was an army exercise going on in which units of the British army were pitted against units of the American army. British armour was entering the wood at one end and at the other, British infantry were hurriedly trying to vacate the place.

We could hear the screech of the tank tracks coming louder, but we were held up by the inability to extricate a truck towing an anti-tank gun from between the tightly packed tree trunks.

A sergeant driver was backing and filling his vehicle to no avail until the axe of the gun became firmly fixed. There was no time to do any more as the American tanks drew closer. The company commander came running to find out the cause of the delay. In his bitter anger, frustration and utter humiliation, the sergeant came out with this sentence which has long been engraved in my memory. “S**t” he shouted. “The fucking f**ker’s f**ked.”

There you have it. The ultimate in Bernsteins restricted code. The sentence was full of meaning to those present, those who shared his ideas had currency in the Spanish language in South America, in Russia of course, and many other language areas.

Religion

In the days of Shakespeare and King James the First of England, there was a protestant Bishop of Armagh called Ussher who took immense trouble and used the Old Testament histories to calculate the exact age of the Earth. He used all the series of of begotten and added them up. His date of “creation” was calculated as “the nightfall before the 23rd October, 4004 B.C.”

This astonishing calculation has caused reverberations through the ages. Ussher’s dates were often included in editions of the King James Version of the Bible in English. They were even included in the Gideon Bible which was left in hotel rooms right up into the 1970s.

There is a very powerful movement of “creationism” all over the English-speaking world. In the United States, members of this movement are even framing laws which intend to allow “creationism” to be taught in schools in direct opposition to scientific knowledge. This movement is gaining ground in Britain. In my area of the North East of England, there is a millionaire who made his money in selling cars. He has used his financial muscle to fund at least two “academies” in which creationism is taught.

In a pub, I met a physics teacher from one academy in Middlesbrough. After quizzing him about what he taught, I asked him to task. “Listen!” he said. “If they are willing to pay me extra money to teach this rubbish, then I will do it.”

There was no answer to that.

Fairy tale science

One beautiful cloudless morning, I arrived with my dome at a primary school in a small West Yorkshire village. I set up my dome in the hall and opened a door to give a supply of fresh air to the air intake. There, in obvious view, was the moon, sharply defined against the deep blue of the morning sky.

When the dome was ready, I went to collect my first class whose room adjoined the hall. The teacher met me with a welcoming smile and invited me to sit down for a couple of minutes whilst she finished her introductory quiz. There was some innocuous stuff, but what brought me up sharp was when she talked about the moon.

“Now children,” she cooed, “When do we see the moon?”

“At night Miss. The moon comes out at night,” the children recited obediently like a pack of zombies.

I reacted instantly and stood up. “Would you excuse us children for a minute? I need to show your teacher something in the hall.” Before she knew what it was all about, I got her out into the hall and immediately marched her over to that open door.

“Look up there!” I demanded. “What do you see?”

“It’s the moon,” she replied, mystified by my attitude.

“But you have just told your pupils that it only comes out at night,” I said indignantly.

“Yes, but that’s what they like to hear,” she explained.

I am afraid that I lost my temper with the lady, who happened to be the teacher in charge of science in the school.

“Who wrote your science text books?” I snarled. “Enid Blyton?” I must have overdone it a bit because she looked shocked. I calmed down a bit and explained. “Think of that boy who is sitting next to the window. He looks outside and sees the moon and listens to you. You have just destroyed his notion of what science is.”

Professor James Flynn of Otago University in New Zealand has been working in the field of intelligence quotients. It seems to me that, although Professor Flynn is writing about IQ and how it seems to be changing from generation to generation, his assertions seem to have a remarkable similarity to the work of Vy-

(Continues on Page 26)
Emotional education with a lasting impact

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Dear Friends and Fellow Planetarians,

This week reminds me why I love my job so much. I have been giving school shows to some enthusiastic 8- and 9-year olds. They are so curious and have so many questions after the show. Their delight as they learn about the universe inspires me!

I remember discovering astronomy when I was just a few years older than they are. But it’s not just the young that can be awed by space. A grandmother came to our public show and it was evident that she was just as fascinated as some of the children. Often adults will not respond to questions that I ask during my live presentation, but this visitor was just as responsive as the children and afterward asked question after question. As she left she kept repeating, “How fascinating it all is!”

I had the opportunity to participate in the Live Interactive Planetarium Symposium (LIPS) at the University of Notre Dame in August. The focus of LIPS is on live, interactive planetarium lessons that can be used in any planetarium, regardless of size or projector.

Some of the themes of this year's LIPS were connecting with your audience, enhancing performance skills, and managing classrooms. One of my favorite quotes by presenter John Kaufmann was “It's not canned versus live, but rather there is a scale between the two extremes.” Notes from 2011 and 2012 LIPS sessions can be accessed at lipsymposium.org/LIPS/node/48.

Colleagues in South Korea

In October, I was invited to address the International Planetarium Movie Festival at the Gwacheon National Science Museum in Seoul, South Korea. In conjunction with the event, Dr. Kang Hwan Lee, the director of the planetarium, decided to host a meeting for South Korean planetarians.

Many new facilities are being built in the country. It's great to have a planetarium, but the staff may not know the best way to use it. Planetariums in the United States faced similar problems during the decades of the sixties and the seventies. At this time the U.S. regional affiliates and IPS were forming, in large part, to address these issues.

Planetarians attended professional development activities and discussed the possibility of forming a Korean planetarium group. I spoke to them about the history of IPS and how they might benefit from affiliation with us. I am quite sure that they will form their own local group and perhaps, in a few years, we will have a Korean IPS affiliate.

As I spoke to the group in South Korea, I was reminded of the goals of our Society. As you can read on our website, “the primary goal of the Society is to encourage the sharing of ideas among its members through conferences, publications, and networking. By sharing their insights and creative work, IPS members become better planetarians.”

This goal is a distillation of the original purposes that our founders wrote 41 years ago. Last year I did some research on the origin of the International Society of Planetarium Educators (ISPE), which was later renamed IPS. In our historical archives, I found the original guidelines that the constitutional committee formulated in March 1971 at their meeting in Baton Rouge. They are six in number. Let me list them just as they were typed on the original copy that I held in my hands last year.

The purpose of this Society shall be:

- To promote the spread of knowledge through planetarium education.
- To improve the quality of instruction in astronomy and related sciences.
- To promote and co-ordinate free exchange of ideas and in [sic] information between planetarium institutions.
- To improve the professional standards of planetarium education through publications and conferences.
- To support and strengthen the activities of planetarium orientated groups, especially the affiliates defined within these bylaws.
- To improve free co-operation and continual dialogue between planetarium education and professional related individuals and groups.

This document is as relevant today as when it was drafted. Most of these points apply to our regional affiliates as well as to IPS. For example, many of our regional affiliate meetings have some type of astronomy update, fulfilling purpose number two. There was an astronomy update at the South Korean meeting. Every year at the Great Lakes Planetarium Association (GLPA) conference that I attend, the astronomy update is one of the highlights of the meeting. I shared the six parts of the original IPS purpose with our colleagues in South Korea and emphasized the benefits that a national organization would bring to them, even if they never become affiliated with IPS.

Passing time, and the baton

This is my last President’s Message. It has been a pleasure to serve all of you in this capacity. The time has passed quickly. Four years ago, as I assumed the office of president elect, December 2012 seemed a long ways off. Now it is time for the baton to be passed to the next president.

I especially agree with the sentiments of Ron Hartman, one of the Planetarian’s early editors. In the December 1981 issue he wrote “In any professional society, the work is shared. One makes his contribution, then turns over those duties to the next generation.”

(Continues on Page 26)
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The moon is the only other celestial body that bears the footprints of humans. It is the symbol of our desire for exploration. It has been our constant companion, there when the first humans looked to the sky and wondered.

So, after all these millenia, why can’t we teach others to understand its movement?
Teaching the inconstant moon

Oh, those plagued moon phases. If there’s one thing in our educational endeavours that gives us the most concern, it’s trying to teach this 3-dimensional concept to young minds not yet able to grasp it.

There are so many prerequisites to being able to understand why the moon changes its shape: the fact that it’s a sphere, that it orbits the Earth while the Earth is orbiting the sun, that its orbital plane is tipped, that Earth is tilted, that sunlight moves in direct lines, and so much more. Our 2-dimensional diagrams try to cram everything into one picture and only succeed in confusing, and, as shown in the paper that follows, our 3-dimensional lessons also may not work.

We can’t give you the moon phase solution, but we can provide you with more information. Because, after all, knowledge is a powerful tool.

More importantly, we can urge you to share your research, your first-hand knowledge, your successes and your failures with others around the world so that we, collectively, can work toward a method that works. We’ll have suggestions on how to do this in the next Planetarian.

Michele Wistisen shares her master’s thesis with us here. Its length prohibits printing the entire document, so we’ve placed the pdf version on the IPS website at www.ips-planetarium.org/default.asp?page=edresources
Several years ago, I learned that many elementary teachers in our district wanted help in teaching their students about the phases of the moon. To fulfill their request, I began a preliminary investigation of our district science textbooks and learned that the primary textbooks had a simplified description of how the phases occur and pictures that showed the sequence of the phases.

The upper elementary or intermediate textbooks had a more detailed description of the sun, Earth, moon system and extremely complex drawings that depicted the appearance of the moon from a space or bird’s-eye view along with what the phases would look like from the Earth. The important facts were present in the textbooks, but teachers expressed that they still struggled to help students comprehend the phases.

I wondered what could be done to change this learning dilemma. I examined books from our public library and searched the internet for ideas from other astronomy teachers and noticed one recurring activity. In this activity, children were invited to hold a ball at arm’s length in front of them and make one complete turn in front of a light source in a darkened room. As the children turned their bodies, they saw the amount of light change on the ball held directly in front of them.

I knew that students benefited from using models and personal observation so this activity as well as the information from our district science books became the body of my lesson design.

During my lesson, the students learned the sequence of the phases, their names, and modeled how the phases occur with the ball and lamp. After each of my presentations, I observed that most students could identify the

As a science educator working in a small Wyoming city, I have the opportunity to work with many levels of school groups. My primary position is the supervisor of a school district planetarium. One of my duties at the planetarium is to develop and present lessons for students in classrooms throughout our district.

Can lessons designed with Gestalt laws of visual perception improve students' understanding of phases of the moon?
eight common phases, put the phases in order, and determine if the phase was waxing (light increasing) or waning (light decreasing).

However, few, if any, of the students could give a scientific explanation of why the phases occurred and many held onto prior misconceptions. Even with a model, students did not appear to comprehend what was occurring or what they saw. I wondered how they could observe how the light changed on the ball as it went around them and still believe such things as 1) the moon turns to show us its dark side, 2) the sun’s movement makes the moon look different, and 3) the Earth’s shadow causes the phases.

I discussed this problem with a vision specialist from our school district. She shared a story with me about an aborigine who, when removed from his home in the dense jungle, saw a water buffalo hundreds of yards away on the open plain; he marveled at such a tiny creature. He did not comprehend that the immense distance made the creature only appear to be small. He had never seen anything so far away.

The bushman story made me wonder if, conceptually, the phases of the moon were so foreign to elementary students that they were unable to interpret the diagrams and the visual experiences that were provided for them. This realization guided my initial research. During a review of the literature, I came to the conclusion that the methods found in most textbooks and those I was using did not adequately help elementary students confront their misconceptions about the phases; students appeared to need more than what was currently available to teachers in order to understand how the phases of the moon occur.

It is from these observations that the topic for my master’s research arose. I resolved to find out what could be done to improve or change the way that students perceived the visual information about the phases.

From my reading I learned that age may be a contributing factor to why elementary students struggle to comprehend the phases of the moon. The National Research Council (1996) recommends that lessons about the phases of the moon should be reserved until students are at least in ninth grade. I also learned how important past experience, or the lack thereof, is to our perception (Smith, diSessa, & Roschelle, 1993) and that studies about improving perception are broad and varied.

However, there are studies in the field of visual perception I felt could use to improve students’ understanding of the phases of the moon. Researchers such as Wertheimer, Koff...
ka, and Kohler (Torrans, 1999; Soegaard, 2003) believed Gestalt laws of visual organization are a way to explain how visual information is interpreted by the brain. Based on principles of their research, I made the following prediction:

If lessons about the phases of the moon are designed using Gestalt laws of visual organization,

- students would have sufficient schema to properly perceive the scientific concepts that are necessary to understand how the phases occur;
- students would confront their current misconceptions about the phases;
- students would demonstrate a greater understanding of the phases than students who are taught using traditional methods.

The purpose of this study, therefore, was to create lessons that included three of the Gestalt laws of visual organization, and to test the effect they had on students’ understanding of the phases of the moon.

**Literature review**

There is little disagreement among researchers that the phases of the moon are difficult to understand. Even though students, by middle school, may know the relative motion of the Earth, sun, and moon, more than half of the students are not able to use models to explain the phases of the moon (National Research Council, 1996; Rider, 2002; Taylor, 1996).

A number of explanations have been offered as to why students find the phases difficult. It may be related to students’ lack of thinking and cognitive deficiencies (Black, 2005; Cohen, 2003), and naïve thoughts (Baxter, 1989; Engstrom, 1991; Keeley, Eberle, & Farrin, 2005).

The American Association for Advancement of Science states that it may be associated with students’ unfamiliarity with the geometry of light and seeing (1993). Dai (as cited in Kavanagh, 2005) in her doctoral thesis alleges that inadequate teaching methods and misleading illustrations may prevent students from comprehending how the phases occur.

Or the reason the phases are hard to understand is because there are concepts within concepts which require an individual to have a depth of understanding about the relationships of the Earth-sun-moon. When students learn about the phases, they are trying to organize information about a complicated model composed of three celestial objects, namely the Earth, sun, and moon.

The phases are also about light and shadow as well as position and perspective. In addition, one must be able to simultaneously categorize information from a space view as well as an Earth view. This type of perceptual activity requires advanced mental gymnastics (Callison & Wright, 1993; Wood, 1988).

Even adults demonstrate a lack of understanding of the phases. In my district, nearly a dozen teachers confessed that they struggled to understand the phases and asked if I could help them by giving presentations in their classroom.

My school district is not unique. Sadler and Schneps (1987) shocked the educational community with their documentary about Harvard graduates’ misconceptions of the phases of the moon in the video A Private Universe: Preconceptions that Block Learning. In addition, Kavanagh (2005) looked at a dozen studies involving college students and preservice teachers and noted that misconceptions about the phases of the moon commonly persist into adulthood.

The fact that organizations such as the National Research Council (1996) and the American Association for the Advancement of Science (1993) suggested students should be instructed about the phases in the ninth grade or later is irrelevant within the context of this study since a number of elementary schools in my district as in other states continue to teach phases of the moon from kindergarten to sixth grade.

Therefore, in an effort to help the teachers in my district, I constructed lessons to present in their classrooms. After giving presentations to fourth grade students in my school district for over five years, I felt frustrated that over half of the students could not correctly explain how the phases occur following my lessons.

Even though I was using activities from reputable sources, student behavior during the lessons caused me to believe that students were not seeing what they were supposed to see. I wondered if there was a connection between students’ comprehension of the phases and their ability to see how the phases occur.

The purpose of this literature review was twofold. First I examined the predominant methods used to teach students about the phases of the moon and looked at the benefits and disadvantages of these methods. Second I looked at studies about visual perception that could help me redesign my lessons to make it easier for students to understand how the phases of the moon occur.

**Current methods**

Ten years ago, when I began working at the planetarium, I could find only a few resources that provided any lessons about the phases of the moon. Technology and access to the Internet has changed information availability. Today, a Google search for lessons about “phases of the moon” would give the user thousands of links to choose from. Though the number of published lessons has increased, my literature review revealed the method of teaching the phases has remained essentially the same.

The phases of the moon are a visual experience. Therefore, it is important to examine how the visual information is presented. Many of the publication that I read, which addressed student instruction about the phases of the moon, incorporated some sort of visual device to help the learner see how the phases occur (Dove, 2002; Hanes, 2006; Hickman, 1993; Kavanagh, 2005; Miyamoto, 1999 Taylor, 1996). For this literature review I drew on three well known astronomical resources, and examined their methods of instruction (see Table 1).

While these are only three resources, they represent the mainstream approaches to how the phases are taught. What follows are descriptions of each of these methods of instruction: diagrams, direct observation, and individual models.

**Method 1: Diagrams**

Diagrams, or images such as the ones found on the NASA web site StarChild, depict the Earth, moon, sun system viewed from somewhere in space. Both diagrams have arrowed lines to indicate the path of the moon’s orbit. One diagram indicates what the moon would look like if viewed from above the North Pole during its orbit (see Figure 1).

The second diagram on the NASA web site
is a diagram of what the moon would look like from Earth at various positions in its orbit and gives the name for each of the phases (see Figure 2).

A third diagram found at StarChild is an amalgamation of an Earth perspective with a space perspective. It shows the path of the moon's orbit, the portion of the moon and Earth that would be illuminated by the sun, the proportion of the illuminated moon we could see from Earth and corresponding images of what that phase would look like from Earth (see Figure 3).

The Astronomical Society of the Pacific also uses diagrams to illustrate how the phases occur in their Project ASTRO resource notebook. Their diagrams show the Earth, moon, and sun system, the moon's orbital path, the names for each of the phases, and what the moon would look like from a person's perspective on Earth if viewed at various times during its 29.5 day orbit (see Figure 4).

An additional diagram is also available of the Earth, moon, and sun system, the path of the moon's monthly orbit, and what the moon would look like if viewed from space above the Earth's North Pole (see Figure 5).

Direct observation
A lengthier method of instruction, direct observation, is found in the Project ASTRO guide. This method suggests students make daily observations of the moon for a month and record their observations. By observing and recording their data, students experience how the moon changes appearance throughout its cycle (see Figure 6).

In the GEMS teacher's guide called *Earth, Moon, and Stars* from the Lawrence Hall of Science, students are instructed to record their observations in a different manner. Using their fists as a standard, students measure how far the moon is from the sun each day. Students create a chart from the data collected for about two weeks of the cycle when the moon is visible during the day (see Figure 7).

Modeling with manipulatives
All three publications listed in Table 1 include an activity where students individually model how the phases occur. Each student holds a ball in front of a lamp in a darkened room. While holding a ball in front of them, students turn their bodies until they make one complete rotation. By doing so, they can see the amount of reflected light on the ball change as they rotate. This activity replicates what someone on Earth would see during the 29.5 day period of the moon's orbit (see Figure 8).

The three methods: diagrams, personal observations, and modeling, can be found in numerous publications. They are the standard approach recommended for teaching the phases. I, too, built my presentations around them. However, after using these approaches for two years I came to the conclusions that students were still not giving up their naïve conceptions about the moon.

When students continue to maintain alternative or incorrect ideas about the phases of the moon after standard lessons, as my students did, I had to wonder if there is something lacking in my method of instruction.

Therefore, as part of the literature review, I examined research about each of the approaches to determine their strengths and weaknesses.

Analysis of methods: diagrams
Diagrams of the phases allow students to see a perspective of the moon that they cannot experience from Earth. Diagrams are meant…
to be simplified representations of a complex system. However, diagrams may simplify reality to a point that students develop misconceptions (Black, 2005; Dove, 2002).

Diagrams such as Figure 2 and Figure 5 are representations of what the Earth, moon, and sun system would look like from above the Earth’s pole. These types of diagrams are misleading because the moon’s orbit is shown aligned with the ecliptic rather than at its true inclination.

If the representation of the moon’s orbit occurred as it is drawn in the diagram, “there would be a solar eclipse every new moon and a lunar eclipse every full moon” (Dove, 2002, p. 831). The illustrations draw a reader’s attention to two of the conditions that lead us to see the phases, but leave out the part about the inclination of the orbit of the moon.

Many students may not be aware that when the moon passes directly between the Earth and the sun it is positioned either above or below the sun from Earth’s perspective. This piece of information is necessary for students to understand why it is not the Earth’s shadow that causes the phases. In addition, Dai (as quoted by Kavanagh) came to the conclusion that direct observation should be the limit of elementary students’ exposure to the phases; the abstract nature of the phases is greater than elementary students’ abilities. Direct observation gives students an opportunity to personally experience the pattern of the phases and the movement of the moon.

Dove (2002) supports direct observation and states that when students make personal observations they are less likely to revert to incorrect ideas about the moon. Both Project Astro and Earth, Moon, and Stars include direct observations as part of their curriculum. When personal observations are correlated with a measured distance from the sun, as suggested by the Lawrence Hall of Science, students can see that the lighted portion of the moon is always on the side facing the sun and the illuminated portion of the moon increases as the distance between the sun and moon increases.

Unfortunately, direct observation does not allow students to manipulate or subject the Earth, moon, and sun to experimentation. Direct observation only gives the students an Earth perspective of how the moon appears to change; it does not allow students to observe why it happens. If students only observe and create a calendar of the phases there is no way for the students to see the geometric relationship that occurs between the Earth, moon, and sun which Callison and Wright (1993) and Nissani (1994) believe is a critical piece to understand how the phases occur (see Figure 6).

**Analysis: direct observation**

Authors such as Keeley et al. (2005) believe that direct observation should be the limit of elementary students’ exposure to the phases; the abstract nature of the phases is greater than elementary students’ abilities. Direct observation gives students an opportunity to personally experience the pattern of the phases and the movement of the moon.
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Day (2001) also noted that students without prior experience have difficulty interpreting what they see and Dove (2002) further indicated that some students have problems reconciling their everyday experiences with abstract models of the Earth, moon, and sun. Personally, for years I saw the moon go through its monthly pattern and never confronted my misconception that it was not the Earth's shadow that caused the phases.

Direct observation may provide students with valuable experiences with which to build upon, but there are limitations. Direct observation does not give students the opportunity to correlate the geometric relationship that occurs between the Earth, moon, and sun with the phases of the moon that they see. In addition, students may not understand that though the appearance of the moon appears to change from our perspective, half of the moon is always illuminated by the sun.

Analysis: manipulatives

Modeling the phases with a ball and light was the third and final method mentioned in the literature I reviewed. Several authors (Barnett, Keating, Barab, & Hay, 2000; Callison & Wright, 1993; Gilbert, 2004; Thompson & Marvin, 1997) believe models help students develop a proper mental representation of how the phases occur.

When using a ball and lamp, students can see that there is a correlation between the position of the moon and the amount of light that is visible. They may also observe that the Earth's shadow does not cause the phases.

But, it is important to remember that even though these models are good for teaching specific concepts about the phases, they are not perfect and may lead students to develop incorrect perceptions (Miyamoto, 1999). For instance, when students model the phases with the ball and a lamp, they may develop the idea that the moon is only seen during the night.

Modeling the phases this way is also confusing to students because they do not understand why they can see the shadowed side of the ball during the activity but they cannot see the shadowed side of the moon in the sky.

Diagrams, personal observations, and modeling with manipulatives provide opportunities for students to see why the phases occur. However, research shows that many students retain unscientific explanations for the phases even after participating in these activities (Dove, 2002; Kavanagh, 2005; Keeley et al., 2005). When all the visible information is presented for the students to observe how the phases occur, why do they not see what is happening? This dilemma led me to the next part of my literature review; a modest exploration of what has been written about visual perception and student learning.

For the rest of this paper, please go to www.ips-planetarium.org/default.asp?page=edresources

References

Because this thesis dates from 2008, and because the internet is a constantly changing entity, some of the web addresses are no longer valid. I have attempted to find and provide the correct link to papers that were still available online as of November 1, 2012. Those I was unable to verify have been deleted. The unedited list can be found on the IPS website. Ed.


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Sacks, O. (1993). To see and not see: A neurologist’s notebook. The New Yorker, pp. 59-73


The new digital planetarium

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Remembering Domefest 2007 and being transported through space and time as I viewed the hypnotic visual and sonic masterpiece *Realm of Light: A Brief History of Life*, it was clear to me that this inspiring program needed to be shared with a larger audience. The show took away honors for best use of dome that year and went on to gain recognition at Immersive Film Festival 09, and again at the Fulldome Festival 2009.

At the screening in Albuquerque, I was introduced to the program’s champion, Rita Werner. Realm of Light is the realization of her idea and was produced by Peter Popp of Softmachine. Erik Frimannslund Brede, Rita Werner, Gerry Winter, and Peter Popp are credited for the original script.

I fell in love with *Realm of Light* and was determined to bring it to our dome theater in Denver. It was a grandiose and poetic work, featuring some of the best sonic and visual choreography ever created for the dome theater.

I had some trepidation however, about running the original program for the Museum review group. Not because of the visuals or the score; I was concerned about the lack of scientific explanation in the narrative.

Here are some excerpts from the original script:
- The early Earth was an... inhospitable place... For millions of years ago, Mother Earth was getting ready for the brew of life...
- Life is a wondrous miracle. It speaks to us every day in millions of ways. Like now... It is time to open your eyes...

Certainly there are audiences that appreciate this original wording. I was concerned that the original story, however, might confuse the typical Denver Museum visitor, who would be expecting a more informative presentation.

Following customary procedures, I went ahead and screened the show for DMNS staff and volunteers and gathered their impressions through written surveys. This rating system provides valuable feedback about the audience experience and the comments that we received supported my suspicions. The museum curators and staff have specific preconceptions for all DMNS offerings. They shared that the original wording was “poetic,” but offered little substance. I received a resounding no-go from the review team.

Pondering what to do, I had the opportunity to meet Peter Pop in Portugal at the Immersive Film Festival 2009. Peter is a delightful German, with keen insight into film making for the dome. Our friendship grew while sightseeing in Porto and when we crossed paths again in 2010, late at night, in a boisterous and cramped café in Jena Germany. After sampling the local brew and cuisine, I shared the feedback from our test screening of *Realm of Light* in Denver.

Peter looked me straight in the eye and said “what do we need to do? How can we make the show work in the Denver Museum”? I boldly replied—American style—straight and to the point “the narration does not work for us at the Denver Museum.” I went on to suggest some changes, pointing out that our audiences expect a more descriptive approach to the narration. I also suggested that any such undertaking would be difficult because we would not want to change the visuals or the magnificent score.

Peter reflected on my critique for a few moments and then said “can you do this work? I want you to bring the show to Denver. I want you to do what is necessary.” A rare and humbling opportunity was now before me. Inspired by Peter’s faith in my production skills, I accepted the challenge.
An agreement is born

Peter wanted to distribute the “re-imagined” version to dome theaters worldwide. We drafted an agreement a few months later over breakfast in Alexandria, Egypt. I outlined the benefits and presented our draft proposal to the museum team and received support to proceed. The proposed script would better meet scientific and viewer expectations for audiences at museums and science centers.

It was now time to get to work. We were careful to craft a narration that would not ruin the fluid choreography of the original program. Since immersive cinema can trigger a strong emotional response from audiences, it is often what is felt that this aspect is more important than what is said. We wanted to express only what must be described, as simply as possible.

While pondering my notes and relaxing in the nearby mountains, the words came to me in a rush. Perhaps the high mountain air had jolted my brain and awakened my muse. In a flurry of writing, I penned most of the re-imagined script in one afternoon.

Here are some excerpts from the original and revised narration.

Original:
And like everything else, stars also have a beginning... Nebulae are the wombs where stars are born... Everything that exists goes through the cycle of life... stars are born, evolve and die...

Re-imagined:
The largest stars mature into convulsing powerhouses, thermonuclear cauldrons, cooking up a stew of heavy elements. For a time, gravity restrains these swelling giants, until unstoppable forces within doom them to cataclysm.

Original:
The early Earth was an... inhospitable place... For millions of years ago, Mother Earth was getting ready for the brew of life...

Re-imagined:
The earliest Earth was lifeless and molten. The weight of our new world pressed inward, heating the center into a forge, filled with dense metals that had sunk to its core. Lava gushed over our planet, spewing acid vapor. Our new world cooled. Seawater and organic molecules concentrated in the oceans, readying the ingredients for the emergence of life.

Original finale:
The earliest Earth was an... inhospitable place... For millions of years ago, Mother Earth was getting ready for the brew of life...

Re-imagined finale:
The earliest Earth was lifeless and molten. The weight of our new world pressed inward, heating the center into a forge, filled with dense metals that had sunk to its core. Lava gushed over our planet, spewing acid vapor. Our new world cooled. Seawater and organic molecules concentrated in the oceans, readying the ingredients for the emergence of life.

Finding the right voice
We auditioned 21 voice-over professionals and narrowed the choice down to Gillian Martin, a local talent with a British accent. She gave the story just what I was listening for, a tone of friendly, worldly authenticity.

I feel that it is very important for a performer to own their part. If they are not engaged in their dialogue, the audience will certainly not become engaged in the program. I also feel that a narrator should be a participant in the final phrasing of the voice over. Their personal language skills are finely honed and they know what sounds comfortable or contrived.

It also helps if a narrator can understand the medium we are working in and what the audience will be experiencing as they speak. In this instance we had the luxury of rehearsing in the dome, well in advance of recording, while experiencing the visuals and music.

I hired the right talent for the job. Gillian enthusiastically embraced the task and suggested a few important revisions. After clarifying subtle pronunciation differences (etherial or ah-etherial), we ventured into the studio. It was now her script. She could imagine exactly what the audience was seeing as she guided them through a Realm of Light.

Keeping the magic in sync
The studio engineer and my colleagues from the museum paid close attention to her cadence and phrasing. Every word had been scripted to work with the existing score and the momentum of each scene. Any mistake recorded at this stage could sound odd or out of context. Because of our advance planning, the session went lightning fast, finishing the recording in about an hour.

Once recorded, we edited our preferred narration segments to the existing video. By watching the video and listening to the score, we could place each phrase into their precise location on the timeline. The track was then ready for final editing in the dome.

I am very fortunate to work with a master re-mix engineer. Without his skills and critical ear the project would have never worked. Provided with the international (no narration) version of the original 5.1 mix and our new narration track, he prepared for the final mix by cleaning up any remaining recording errors.

Once all 7 channels of audio were completed, we set up a sophisticated mixing system in the planetarium dome. Our Pro Tools system sent time code to the fulldome video servers. The audio tracks were balanced and routed through a Lake Huron auralization system, which generated 3D audio over our 15.1 loudspeaker array. With this set up in the dome theater we use the Pro Tools editing interface to jump to any point in the program and listen to each edit in synchronization with the fulldome video. This fluid, real-time workflow is fantastic fun.

This system has served us well and ensures that what we mix will be exactly what the audience hears in the dome. We carefully adjusted the level balance between voice, music and sound effects as we listened and watched. We also made some final adjustments to the narration timing against the video and soundtrack.

We added a new opening title video, updated the credits and removed the last scene of the show, which no longer fit with the revised script. We verified everything one last time while sitting in various seats in the planetarium and then made the final recording.

We record the signal for each of the 16

(Continues on Page 26)
gotsky and Bernstein. He writes about “utilitarian spectacles and scientific spectacles.”

Flynn postulates that basic intelligence in any particular community is roughly the same the world over. However, the environment a particular community faces modifies the kind of intelligence which successful living in that community requires.

He cites some interviews with some village headmen in farming communities in the steppes of Russia. They were told that where bears lived in ice and snow, they were all white. Then they were told that, in the Arctic regions, it was all snow and ice. And then asked, “What colour would the bears be?” They said they did not know. If a wise man came from there and told them, then they would accept that fact. They would not allow their brains to take the logical step.

If the same questions were asked today, the answers would be different and “logic” would have been used. Flynn talks of “utilitarian spectacles” and “scientific spectacles” and active and passive vocabularies. Underlying all of this, I feel that Flynn and Vygotsky were reaching for the same fundamental truths.

Whereas Vygotsky and Bernstein talk about social groups and how these impinge upon the development of limited language codes, Flynn develops a parallel case in which the size of family has an effect upon a child’s language skills. It works like this.

A single child with two parents will grow up with the parents’ language dominating the home, whereas a child growing up in a family with five children will grow up in an environment in which he or she hears children’s speech all around.

Conclusion
In our so called “modern” society, we highly prize a mind which can apply analytical and forensic thought to a problem. We see this as a means by which our society or nation can compete in the modern world of technology.

However, there are many amongst us who will never get their brains to take the necessary logical steps. I have listed some of the agencies which can cause this inability. If you know of others, please let me know.

With regard to the teaching and learning about astronomy, formal education in mathematics is essential. However, before this can be accepted by the brain, a mindset occasioned by the social background with its influence on the development of what we like to call a logical framework is essential.

There is a large section within our society which contains people whose brains, of demonstrable intelligence, can never accept what we like to call a scientific construction of concepts. As educators of astronomy, we have to keep our feet on the ground.

Tail piece
I belong to a club called the Hartlepool Retired Men’s Forum. The membership is mostly made up of retired professionals, engineers, businessmen and similar people. I gave a short series of lectures there, each about one hour long, but, because my sight was limited, I offered no visual aids.

The last one of the series was on the subject of light. As I moved along the historical framework, from the discovery of one concept to another, I presented all the logical steps, asking for questions along the way to clarify any particular point.

Questions did not come, at least during the talk, but many followed when someone got me in a corner somewhere. I realised that nobody wanted to betray their lack of understanding. They were not children whose role in life is to ask questions. This audience included the like of former headmasters, doctors and so on. Some even arranged to visit my home and take up various points of discussion.

As I was being taken home as a passenger in a neighbour’s car, instead of being congratulated on the success of my talk, inside the car was all silence. My impatience won and I finally asked what the others thought about the talk.

They were a bit embarrassed, but the consensus was that I had “gone on a bit.” When, finally the other passengers had been delivered home and I was left with my neighbor, the driver, the conversation turned to the fact that I had been suffering with cramp in my left leg.

“Oh!” my neighbour said. “There is no need for you to suffer from cramp ever again.”

“Yes is that?” I asked innocently.

“No,” he answered. “All you have to do is sleep with a new bar of Palmolive soap under your pillow.”

He was absolutely serious.

There are still challenges and opportunities ahead for the planetarium community. We need more research to show the efficacy of planetariums in education, both formal and informal. Our Planetarian editor wrote about this in the March 2010 issue and later presented a paper on the subject at a GLPA conference. Yes, planetariums are inspiring, but administrators want hard data in order to provide continued funding.

IPS should take a lead in refining the questions that need to be asked about the educational efficacy of planetariums and to encourage the research necessary to determine the answers.

There are also opportunities for IPS to reach out to colleagues in developing countries and to find ways to do more collaborative projects. Jim Switzer was deputized to serve as the IPS representative to an IAU Office of Astronomy for Development workshop in Cape Town, South Africa last December. As this IAU program progresses there are important ways in which planetariums and IPS can help.

I want to especially thank my fellow officers. They have been a wonderful team to work with and so much of the work of our Society depends upon their contributions. On January 1, 2013 Thomas Kraupe will assume the presidency, we will have a new president elect, and I will serve as past president. Lee Ann Hennig and Shawn Laatsch will continue as secretary and treasurer/membership chair, respectively.

I also thank our affiliate representatives, committee chairs and committee members.

And finally, thank you to each of you, the members of IPS. I am so impressed by the wonderful work that you are doing, especially what I heard from many of you at the IPS conference and what I read in the Planetarian, Dome-L and other sources. I have enjoyed meeting many of you during my term as president and look forward to visiting and learning from you in the future. I extend best wishes to you for a productive 2013.

Ray Worthy, continued from Page 8

(Denver, continued from Page 25)

speakers as well as the S1 master mix. This S1 distribution mix is no longer international, as it contains the voice mixed over the front channels along with the music.

We opened the show in Denver with an enthusiastic response from audiences and the program continues to run here at DMNS. At IPS Peter and I were, at long last, able to enjoy this re-imagined work together and then share it with the world.

As I enter my second decade of fulldome production, I understand that regionalizing a program is one of the great opportunities and challenges of our medium. Customizing any program for specific audiences or cultural preferences should be done in concert with regional professionals.

I am very grateful to Peter for allowing me to play a part in this great project. The re-imagining of Realm of Light was not a trivial task, but it has been a very rewarding experience.

Realm of Light-re-imagined:
SciDome Touch is the only digital planetarium with the resources you need for comprehensive earth and space science teaching. Powered by Starry Night and The Layered Earth, SciDome Touch lets you share award-winning curriculum with your students, inside and outside the planetarium.

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The city of Rio de Janeiro is well known around the world as a great tourist destination. Few large cities have such natural beauties as Rio, with its beaches and rainforests, all within the city limits. This exact, and unique, landscape was recently declared by UNESCO a "World Heritage Site" named “Rio de Janeiro: Carioca Landscapes between the Mountain and the Sea.”

Rio has a lot of history, being one of the oldest cities in Brazil. It was the nation’s capital until 1960. And it is the signature name for Brazil around the world. In the next few years, Rio will host the Soccer Confederation Cup (2013), the FIFA World Cup (2014) and the Olympic and Paralympic Games (2016).

This is the cultural environment that compelled the Rio de Janeiro Planetarium Foundation to host its first Workshop on Fulldome Production, in November 2011. We had two keynote lecturers, Shawn Laatsch (Imiloa Astronomy Center of Hawaii) and Antonio Pedroso (Navegar Foundation), who are both well known to Planetarian readers. We also had some local lecturers, ranging from college professors and planetarians to television producers.

The success of this first event lead us to dream higher, and plan for a second one. In association with the largest private university in Rio, (Pontifical Catholic University of Rio de Janeiro, often abbreviated as PUC-Rio), which is just across the street from our main building, we promoted the II Workshop on Fulldome Production, in November 2011. We had two keynote lecturers, Shawn Laatsch (Imiloa Astronomy Center of Hawaii) and Antonio Pedroso (Navegar Foundation), who are both well known to Planetarian readers. We also had some local lecturers, ranging from college professors and planetarians to television producers.

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The workshop was a full-day closed event, aimed at planetarians (we had eight planetariums from around Brazil send representatives to attend; that is roughly 20% of all fixed domes in the country), designers, computer artists and other professionals interested in learning fulldome techniques. Our main goal with this workshop was to create some critical mass in Brazil so we can start developing our own shows, customized to our needs, focused on the “right” side of the sky (we are in the Southern Hemisphere, after all).

As keynote lecturers, we had the honor to have Steve Savage (SkySkan, Inc.) and Spanish animation artist Jordi Grangel (Grangel Studios). Steve is a living legend in our business and shared with us, throughout four days, his personal recollections on the history of fulldome and his experiences in shooting real images for fulldome productions.

Jordi comes from a different background, having worked with big Hollywood productions such as Tim Burton’s Corpse Bride and DreamWorks’ Madagascar; he gave us an overview on how to design characters.

Doubling the offer from last year, we had two other short courses, given by Brazilian professionals. From PUC, which is helping us develop our first brand new fulldome show, we had the N.A.D.A. team talk about their trials and tribulations in this process.

N.A.D.A. (which is the Portuguese word for “nothing”) is the acronym for Animation and Digital Art Center. Amateur photographer Carlos Carvalho (known as Cartola) gave us a whole week of a hands-on coursework on “Immersive Digital Photography and Image Manipulation through Free Software.”

Following last year’s successful model, we added to the short courses a series of stand-alone lectures given by Brazilian professionals. World-famous graphic designer Hans Donner (from Globo Network Television), Labareda Studios and Luiz Velho (from IMPA) shared their knowledge on the field.

The big news happened after class, however. Every night, from 7 til 9 p.m., we opened our digital dome to the public, free of charge, and showed some of the best fulldome content (Continues on Page 46).
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Pre-requisite: Read the first installment of this in the June 2012 Planetarian.

Briefly, the first installment we discussed important subjects such as:

- The immediate phase out of computer RG-BHV (VGA) connections beginning in 2013 with the technology to be off product lines by 2015 at the latest.
- Analog Sunset–2010. All Bluray players, HDTV tuners, etc. have utilities burned into their chipsets that will automatically turn off the component, composite, VGA and S-video outputs on December 31, 2013.
- Proper installation of a new DVD player, Blu-ray player, HDTV tuner, or computer.
- Why using a little adapter to convert your HDMI/DP port to VGA won’t work. The reason is HDCP.
- Adding a video source converter or scaler/switcher.
- Mismatched projector and device resolutions.

Now, let’s move onward.

Cable length and Extenders

If you review the distance limitation table (Table 1) in the first article, you see quickly that video signals are not designed for use with long cables. Some only work accurately with distance as short as 6 feet (1.8 meters). The minute you exceed these lengths you are degrading the video signal.

How much degradation of the picture quality is acceptable is up to you, but be assured any length above what is shown in the table introduces degradation.

Cable types

One thing to keep in mind is that for audio/video work, CAT6 is not better than CAT5. You must use the cable type that the extender manufacturer recommends. Period. If you want to know why, just contact Mark Trotter or me and we’ll explain it to you.

Audio Cables: Most of you know that 2-conductor unbalanced audio (typically RCA connectors) is only reliable for up to 15 feet (4.6 meters) Very low cost CATS/6 extenders are also available for unbalanced audio that can extend the signal hundreds of feet.

However, in a modern HDCP compliant video system, most of the audio is digital and is carried along on the same HDMI or DisplayPort cable and connectors as the HD video. So how do you get it into your audio system?

Decoders and audio

What we do is run the digital video signal thru a decoder, often built into a switcher. The decoder breaks out stereo, 5.1 or 7.1 audio streams from HDMI and DisplayPort signals and converts them into the proper signal to be routed to your stereo or surround sound audio system. The best decoders will decode all the various formats of DTS, Dolby, PCM... but not all do. A good decoder can also be controlled via your theater control system and should provide professional three-wire balanced outputs.

There’s more to this topic, as always. Your are invited to study this topic more on any of the numerous websites out there, or just contact any of us at Bowen Technovation for more information and advice.
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Minutes of the IPS Council Meeting
Alfred C. Glassell, Jr. Board Room
Shaw Center for the Arts, LSU Museum of Art
Baton Rouge, Louisiana
July 21 - 22, 2012

* indicates action items
In attendance:
President Dave Weinrich
President Elect Thomas Kraupe
Past President Tom Mason
Treasurer Shawn Laatsch
Secretary Lee Ann Hennig

Affiliate Representatives:
Association of Brazilian Planetariums (ABP) - Dr. Alexandre Cherman
Association of Dutch Speaking Planetariums (ADSP) - Anne-Lize Kochuyt for Andre Milis
Association of French Speaking Planetariums (AFSP) - Anne-Lize Kochuyt for Andre Milis

Society of German Speaking Planetaria (GDP)
Russian Planetarium Association (RPA) – Lars Broman for Zinaida P. Sitkova
Middle Atlantic Planetarium Society (MAPS) – Mike George

Southeastern Planetarium Association (SEPA) - John Hare
Southwestern Association of Planetariums (SWAP) - Rachel Thompson

Guests:
Jon Elvert - Chair, IPS Outreach Committee, and Pennington Planetarium, Baton Rouge, Louisiana, USA, IPS 2012 Conference Host
Dr. Jin Zhu - IPS 2014 Conference Host, Director, Beijing Planetarium, Beijing China
Yaroslav Gubchenko - Executive Director, Fulldome Film Society, Moscow Russia
Filippova Iryna - Donetsk Digital Planetarium, Ukraine
Vitaly Slysarenko - Kiev Planetarium, Ukraine
Gianluca Ranzini - IAP
Martina Jauregui - APLE
Dr. Björn Voss - GDP
Alex Delivorias - EMPA
Francisco Alcaraz - AMPAC
Carmen Gonzalez - AMPAC
Dr. Dave Smith - Chair, IPS Publications Committee
Martin George - Chair, IPS International Relations Committee & Elections Committee

Secretaries:
Susan Button - Chair, IPS Portable Planetarium Committee
Martin George - Chair, IPS International Relations Committee & Elections Committee

Treasurer Shawn Laatsch presented the Treasurer’s Report. Council reviewed and discussed specifics of the 2011 Financial Report, the mid-year 2012 Budget, and the proposed 2013 budget. The Audit Report of 2011 confirmed that the treasury is in good standing and the document has been posted on the Council Group Site. Shawn recognized Ash Enterprises and Digitalis for their contributions to promoting membership in IPS. Shawn encouraged others to consider similar initiatives and pointed out exemplary efforts, such as GLPA’s request as check box on their membership application asking if you are an IPS member, Thomas Hamilton’s scholarships for IPS memberships, and Jeff and Linda Bowen’s planned gift for IPS.

The Treasurer’s Report was filed. As Membership Chair, Shawn reported that the total membership as of June 2012 was 719. Shawn also provided an overview of the Associate Membership initiative to date. The enrollment is down by 10 from last year.

The Membership Report was filed. Past President Tom Mason presented his Past President’s Report, which will be printed in the September 2012 issue of the Planetarian. (Editor’s insertion: printed in the December 2012 issue.) Tom spoke of his rich experiences during the 6 years he fulfilled the duties of the office the friendships he enjoyed, the work on behalf of IPS he shared with Council, and his dreams for continued success and goals for the organization. Tom will receive the President’s Award at the IPS Banquet at this conference.

President Dave Weinrich delivered the

(Continues on Page 34)
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contact: Maja Prus and Silke Damerow • phone: + 49 40 428 86 52 51 • mail: distribution@planetarium-hamburg.de
President’s Report. This report will also be published in the September 2012 issue of the *Planetarian*. Dave continues to work on behalf of updating the status of IPS Affiliates and promoting new applications. He stressed the importance of service to IPS and realizing the opportunities that our organization has to offer to planetarians. The Past President’s and President’s Reports were filed.

Affiliate Reports
As a review and because of the presence of many new Council representatives, President Dave Weinrich discussed the responsibilities of Affiliate Representatives. He also encouraged our members to become more involved in the duties and activities associated with representing their Affiliates. We have seen an increase in Council business throughout the year, not just limited to traditional Council Meeting, and it is important for all out affiliates to be represented at all times.

Written Affiliate Reports were reviewed and Affiliate Representatives highlighted events and concerns from their respective reports. In news from the floor, ADSP Representative Anne-Lize Kochuyt reported that her colleagues are having difficulty recognizing the benefit of being an affiliate of IPS. Council Members discussed their feelings related to the topic of conference attendance (networking, renewed enthusiasm, energy, and passion, the benefit of sharing these experiences with other cultures, etc.).

GDP Representative Christian Theis reported that restructuring for a new organization of the Society of German-Speaking Planetarians, replacing the former Council of German Planetarians (RDP) and widening its scope, was complete. Formal recognition of the organization as an affiliate was approved by Council in May 2012.

RMPA Representative Mike George spoke about the declining membership in his affiliate’s region and efforts involved in addressing the issue.

SEPA Representative John Hare reminded Council that helping defray conference costs was a major goal for SEPA. One of their initiatives is to offer stipends (20) to members for conference attendance. SEPA also designates 10% of vendor donations to finance the stipend fund.

Throughout the Affiliate Report discussion Council addressed the need to focus on translation services and other methods to be more inclusive of cultural differences among our members.

Many Affiliates reported on their outreach efforts regarding the June 2012 Transit of Venus and addressing the 12/21/12 Mayan Cal-endar issue. Affiliates were reminded to use the updated template to file their reports and include the Affiliate logo on the IPS Affiliate webpage. The IPS Affiliate Reports will be posted on the IPS Website.

The Affiliate Reports were filed. Affiliate Reports not submitted: Association of Brazilian Planetariums (ABP) Canadian Association of Science Centres (CASC)

Conferences
IPS 2012 Conference

IPS 2014 Conference
Dr. Jin Zhu, IPS 2014 Conference Host, presented a report on the plans for the conference in Beijing China. The Conference is scheduled for June 23-27, 2014, preceded by the Council Meeting on June 21-22. Details and updates are posted on the Conference Website www.ips2014.org and will be published in the *Planetarian*.

IPS 2016 Conference Bids
Council reviewed proposed bids for the IPS 2016 Conference from three sites:
1. TELUS World of Science, Edmonton, Alberta (Canada) - presented by Ian McLennan, Steve Baker and Frank Florian
2. Cité de l’espace, Toulouse (France) - presented by Marc Moutin
3. Copernicus Science Center, Warsaw (Poland) - presented by Dr. Maciej Ligowski and Dr. Kamil Zloczewski

Council will be monitoring the bid proposals as they formalize their plans for final bid presentations at the 2013 IPS Council Meeting. Information on the three bid proposals will be posted on the conference websites linked to the IPS Web Site. There will be articles published in the March 2013 *Planetarian* containing information regarding each potential conference site so that the membership can compare the bids. Affiliate Representatives will be working with their members to inform them about which site is most desirable. Each of the bids will be presented at the General Business Meeting during this conference. On behalf of Council, President Dave Weinrich thanked the bid presenters for their efforts in planning and preparing the proposals and for their willingness to host an IPS Conference.

The first day of the Council Meeting was adjourned at 5:30 p.m.

The second day of the Council Meeting was called to order at 9 a.m. on July 22, 2012.

Standing Committee Reports
Standing Committee Reports were presented, reviewed, and discussed. The full committee reports will be posted on the individual Committee Webpages on the IPS Website.

Awards Committee
Chair Lars Broman presented the IPS Awards Committee Report. The President’s Award, the IPS Fellows, and the IPS Service Award honorees will be presented to the membership at the IPS Luncheon. A review of the Awards presented will be published in the December 2012 issue of the *Planetarian*. The 2012 IPS Award recipients are: IPS Service Award: Sharon Shanks and April Whitt
President’s Award: Past President Tom Mason
2012 IPS Fellows: Bart Benjamin, Gail Chaid, Alex Cherman, Alex Delivorias, Bjorn Heiden, Tom Mason, Christopher Reid, John Schroer, Sharon Shanks, Dave Weinrich

Technology and Innovation Award: none awarded this cycle

Lars suggested that previous recipients of the Service Award (who were presented with Plaques) be offered the opportunity to update the crystal version. Thomas Kraupe moved that Council allow any recipient of the Service Award to replace the older version of the award with the crystal version at the recipient’s own expense, seconded by Patty Seaton and approved by Council. Affiliates are encouraged to submit nominations for IPS Awards to the Awards Committee.

Elections Committee
Elections Committee Chair Martin George presented the IPS Elections Committee report. Several individuals have expressed interest in running for the office of President Elect. For the offices of Executive Secretary and Treasurer/Membership Chair, Lee Ann Hennig and Shawn Laatsch were contacted and asked if they would consider running as incumbents for the offices they currently hold; they agreed. Martin expects to have the candidate list ready by the General Business Meeting, at which time additional nominations will be entertained from the floor and the candidates will give brief statements. Affiliate Representatives are urged to encourage their membership to consider running for an IPS office.

ABP Alex Cherman suggested that the actual vote count for elections be announced and published. The present Standing Rules would have to be amended to allow for that change in procedure. After discussion by Council, John Hare moved to change the last sentence in Standing Rule Appendix B. IX, to read: “The
actual count of the votes will be published,” seconded by Alex Cherman and approved by Council.

Publications Committee

IPS Publications Committee Chair Dale Smith presented his report. Executive Editor Sharon Shanks continues to bring outstanding quality and content to our journal along with seasoned editorial oversight and a distinguished roster of columns and advertisers. Two new types of articles have been introduced in the past year: “Under One Dome,” showcasing an individual planetarium, and “How We Do It,” describing methods and tricks of the trade.

The 2011 edition of the *IPS Directory* (which includes the *IPS Directory of the World’s Planetariums*, the “white pages,” and the *IPS Resource Directory*, the “yellow pages,” was distributed to all members in December in CD format. Serving as Editor of this publication for 15 years, Dale’s process for gathering updates is Herculean. He walked Council through the steps involved. Eventually the Directory will be available on the redesigned IPS web site.

Standing Committee Reports were filed.

Ad Hoc Committee Reports

Ad Hoc Committee Reports were presented, reviewed and discussed. Complete reports will be posted on the IPS Web Site Committee Pages.

Education Committee

The written Education Committee Report from Chair Jack Northrup was reviewed. The Committee continues to focus on updating links and adding a section on blogs and podcasting. There is a focus on working with regional groups on the development and implementation of the U.S. national and state standards for science and astronomy. A new initiative will be to create lessons that utilize IPS’s membership to assist in establishing international cooperative activities.

Fulldome Committee

Shawn Laatsch reported that Antonio Pedrosa, Chair of the committee, is working on efforts to identify goals and objectives of the committee. The issue of establishing standards for this aspect of the planetarium community is challenging. Chair Antonio’s report emphasized that this conference will host a number of activities related to fulldome activities.

History Committee

Historian John Hare reported that his committee is continuing to make progress on completing the scanning of slides and photographs of archival material (approximately 10,000 images are in the archive). There will be a Memorial Presentation during this conference for IPS members who have passed away during the last 4 years. Ian McLennan and Thomas Kraupe are also involved with John’s efforts to maintain a database and create a digital memorial as a mechanism to recognize recently passed members.

International Relations Committee

Chair Martin George and his committee have vigorously promoted IPS across the globe in several venues. Yaroslav Gubchenko demonstrated a portable dome and Chair Martin presented a talk “Planetariums of the World” at the IAU Asia-Pacific Regional Meeting in Chiang Mai, Thailand. Other efforts reached into Beijing, China and the Philippines. The committee’s scholarship documents were put into practice for the 2012 IPS Conference in Baton Rouge and a number of applications were processed and awarded. There will be an evaluation of the application procedure to make improvements on the documentation for future conferences. The Committee will continue its investigation into providing translation services at conferences.

Outreach Committee

Chair Jon Elvert presented the report on Outreach efforts. As a recipient to a NASA-funded grant, all IPS members attending the IPS2012 conference will receive a DVD of the fulldome show We Choose Space! As IPS 2012 Conference Host, Jon personally communicated with individuals, vendors, and facilities that should benefit the IPS community by becoming more involved and sharing resources. The committee continues to pursue partnerships and exchange of resources with other organizations.

Portable Planetarium Committee

Chair Susan Button presented her report on Portable Planetariums. The Committee has intensified its emphasis on live interactive lessons, especially in small and portable domes, which has resulted in a renewed interest in that aspect of presentations. “Live Interactive Planetarium Symposium” (LIPS) are meetings devoted to this trend. Look for an update on the documents for the Committee’s work on the redesigned IPS website.

Professional Services Committee

President Dave Weinrich reported that he has had several conversations with Shaun Leverment, who will be the new Chair of the Professional Services Committee. She had drafted some ideas and objectives for the mission of the committee.

Script Contest Committee

Chair Thomas Kraupe reported that despite the efforts to broaden the participation in the contest and revise the rules, there was still only one entry and hence no award can be handed out. Thomas thanked the Eugenides Foundation for its support. Manos Kitsonas commented that the Foundation will keep supporting IPS and will target alternative areas of creative work in the planetarium area. The Committee’s suggestion to work with Eugenides Foundation on replacing the current award with a production award or by supporting professional development or workshops in the area of scriptwriting and storytelling at future IPS conferences or between conferences had already been approved by the Officers. A new proposal relating to that partnership with the Eugenides Foundation will be put forward to Council. As a first signal towards that goal, prize money for 2012 will be used to honor the best of the “best creative fulldome productions” at the domefest held at this IPS 2012 Conference in Baton Rouge. Council looks forward to a new proposal relating to a partnership with the Eugenides Foundation.

Technology Committee

Chair Jack Dunn reported on efforts of the Committee to provide information to planetarians on software for converting video formats that is free, considering that budgets are tight. Articles will be published in the Planetarian and made available on the IPS Website. The committee sees its main function as being helpful to personnel of various types of facilities who are faced with using more technology in their normal routines. Since this committee has “absorbed” the duties of the former Planetarium Development Group Committee (chaired by Ken Wilson), an update of the basic document “So You Want to Build a Planetarium” is overdue and will be an important task.

Strategic Planning Committee

President Dave Weinrich requested Council to submit any items/suggestions for consideration to the Officers.

Web Committee

Chair Alan Gould’s presented his Committee’s report, which focused on the redesign and migration of the entire IPS site to its new home. The site went live a few months before the IPS 2012 Conference and although there is a steep learning curve, the new site will al-
The New IPS Website: More features for interaction

Alan Gould
tagould@berkeley.edu
Chair, IPS Web Committee
Lawrence Hall of Science
University of California
Berkeley, California, USA

IPS has had a website since the late 1990s, not that long after the Internet as we know it developed. We acquired the domain name www.ips-planetarium.org in 1998 and Tom Callen became webmaster as well as IPS Web Committee chair.

Tom held that chair until August of 2006, when I became the Web Committee chair and webmaster. I wasted no time returning to the old knobs and switches in the left navigation that I was so proud of.

We owe many thanks to Ken Wilson and Jim Peck of the Science Museum of Virginia for the years that the IPS website was hosted there at no charge to IPS. The site had some shortcomings, however. The members-only pages did have password access, but it was the same password for everyone, which was not terribly secure. It had no special tools or features and no sophisticated communication functions that could be used by groups, committees, or Council.

To overcome these shortcomings, the IPS Executive Committee and Council tasked the IPS Web Committee to design a new site with more modern look and functionality. We explored a few ideas, but the breakthrough came in 2011 when IPS Treasurer Shawn Laatsch investigated possibilities and recommended that IPS contract with a professional website host company: yourmembership.com. The new IPS website was launched in April 2012, with the bulk of the content transferred over from the previous website.

In the screenshot of the upper part of the new IPS home page (Figure 3) note that several left navigation categories are carried over from the previous site, but some are new. In particular, new items are:

• Career Center
• Groups, where the IPS Executive Committee and Council have communication forums.

Committees also can setup up groups.

• Resources, where there is a new submenu called “Free Media,” where music and visuals may be found that are offered for free to anyone. It is a good place for even commercial artists and media professionals to display sample works. This may be viewed as “free” advertising in exchange for offering valuable resources to the planetarium community. There is also a “members only” free resources area, accessible only to IPS members.

In the upper right, you can see a conventional “sign in” feature that allows members access to the members-only pages. Once one signs in, a new left navigation item appears, Members Only, which currently has these submenus:

• Issues of Planetarian online
• Full IPS Membership Directory files and Resource Directory files
• Free music

As one might expect in a modern organization website, members can change their own passwords in the new IPS site. When the new site launched, Shawn Laatsch announced, via membership email, a generic password, with encouragement for members to sign in and customize their password.

New features for members

Renew Your Membership (under Membership Info): This is one of a number of new features that are highly useful to our beloved treasurer. The new site offers a highly user-friendly and powerful database for serving membership functions. This feature also serves our IPS Directory curator, Dale Smith.

Career Center. This area has a lot more member functionality than the old jobs area. Any member can log in and post a job or search the listings for jobs available.

Surveys. The site has a nice survey function that we have already used for the latest IPS election as well as a feedback form for the IPS 2012 Conference in Baton Rouge. Survey results can be restricted to certain members or made available to all IPS members—or even the public.

Forums. Forums are, in some ways, similar to groups. A group and a forum are both composed of IPS members, and there are functional similarities in that they are both means of sharing information. Perhaps we can think of a forum as more topic-centered (e.g. sharing fulldome production techniques or educational strategies), while a group is more task-centered (e.g. Technology Committee).

Groups can be formed from any subset of IPS members, and can share information and conduct business right on the website. The first groups to be formed are the IPS Council and IPS Officers. The Education Committee (Continues on Page 46)
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Every second year, at the IPS Conference, it is the time to give Awards and to name Fellows of IPS. Next time will thus be in Beijing, China in 2014.

It is IPS Council that decides which persons should thus be honored, and it is the task of IPS Awards Committee to prepare the background material from which the Council can decide. It is a rather long process, since the time when Council meets is a whole year in advance, the next time in Balzano, Italy 9-10 August 2013.

Therefore, now is the time to nominate! Your nominations should reach the Awards Committee no later than 1 June 2013 so we can prepare a recommendation for Council’s decision.

You can send your nomination to any of the Award Committee members. We are Jeanne Bishop, Susan Button, and Lars Broman, and our addresses are jeannebishop@wowway.com, sbuttonq2c@gmail.com, and Lbr@teknoland.se, respectively. Please include the reasons why you think your nominee should be awarded or named a Fellow.

IPS has three kinds of awards. First is the classic IPS Service Award, on which our Standing Rules say: “An IPS Service Award shall be bestowed, from time to time, by the Society upon an individual or institution whose presence and work in the planetarium field has been, through the years, an inspiration to the profession and its members.” Between 1982 and 2012, twenty-three Service Awards have been given.

The second award is the IPS Technology and Innovation Award which, according to the Standing Rules, “shall be bestowed, from time to time, by the Society upon an individual or commercial vendor whose technology and/or innovations in the planetarium field have been, through the years, utilized or replicated by other members and/or planetariums.” This is a rather new award, and it has so far been given only twice, in 2008 and 2010.

The IPS President Award is given to the latest IPS Past President; no nomination is thus required.

Deserving members of IPS can be named IPS Fellows. In order to be named a Fellow of IPS, the Standing Rules say that “a member must have continuous active membership in good standing in IPS for at least five years, and substantial contributions in at least two of the following respects: (1) Serving IPS in elective office, diligent and/or devoted committee work, and the organization of conferences and meetings. (2) Relevant and significant publications and/or conference presentations. (3) Cooperation with professional societies, organizations and groups which bring attention to the importance of planetariums’ existence. (4) The development of new methods in the planetarium field.” Since the mid-1980s, 242 IPS members have been named Fellows of IPS.

During the awards luncheon in Baton Rouge 25 July 2012, first the following ten planetarians were named Fellows: Alexandre Cherman, Brazil; Alex Delivorias, Greece; Tom Mason, Northern Ireland, UK; Björn Hedén, Sweden; and Bart Benjamin, Gail Chaid, Christopher S. Reed, John Schroer, Sharon Shanks and David Weinrich, USA. They were given each the classical Fellow diploma, used since the 1980s.

The President Award was given to our Past President Tom Mason. This year, no Technology and Innovation Award was given.

So, concluding the awards ceremony, the prestigious Service Award was given to two well-deserving planetarians, both well-known to the readers of *Planetarian*: Planetarian Editor Sharon Shanks and long-time Planetarian Associate Editor and Columnist April S. Whitt. Since 2008, awards are engraved heavy pieces of crystal glass, hand-made at Nybro Crystal, Sweden.

The names of all previous Awardees and Fellows are found at www.ips-planetarium.org/?page=awardees. The complete rules are found on page 16 in IPS Bylaws and Standing Rules. You can download a pdf version at www.ips-planetarium.org/?page=rules.
Dear colleagues and friends:

This is my last report to the IPS Council as an elected office bearer. At the end of this year, when the new president is elected, the past president slips quietly back into the planetarium sea of ordinary members. This means a change from trying to be a beach master, keeping up with the myriad things that IPS presidents need to attend to.

The first thing to say to you is that I was more than a little surprised when I was asked to put my name forward as a presidential candidate at the Melbourne conference. I was a late convert to the planetarium scene. There seemed to me to be many better qualified and more knowledgeable candidates and I thought that I would simply be adding to the democratic process permitting a wider choice to the members. So I was quite surprised when I was elected. Assuming that the membership knew what they were doing, I picked up the baton of president elect and joined the officer class.

A difference in focus

I have been an office bearer in many other organisations relating to my first career as a geology professor in South Africa. The primary difference is that those organisations concentrated on tangible objects rather than the fabulous untouchable cosmic images that technology delivers to my computer on a daily basis. Despite this fundamental difference of tangibility, the common ground is that all of the organisations I have worked for were driven by the need to communicate.

Planetarians are story tellers, pure and simple. They communicate by example and deed, and also by oiling the gears of the communication machine with the lubricant of boundless enthusiasm.

I have been a professional communicator and teacher all of my adult life, and like me, you all know that there is no greater pleasure than seeing the knowledge and awareness grow in students and audiences as you explain something to them. I call it the light of knowledge. You can see it dawn in their eyes as the jigsaw pieces click and the blurry, partly formed image swims into focus. We humans are hard wired to learn in pictures; the occurrence of ancient and modern pictographic languages, and their forebears, stone age carvings and engravings bears this out.

I also strongly believe in two things: teachers are born, not made, and learning by stealth is the best way to impart knowledge. Any learner does better when they do it for themselves: hands on is the gold standard. And the learning beds in even better when the “lesson” is craftily concealed in the “doing.” This is the essence of stealthy instruction.

A beneficial combination

So astronomy, with constellation pictographs and the incredible images from all parts of the electromagnetic spectrum, is perfectly positioned to exploit how we all learn. I am enthralled by the stream of beautiful art that flows from the satellites that orbit not only our own planet, but also Mars and Saturn. This feeds my need to see for myself the images of sand dunes and impact craters that pattern Martian deserts, as well as the instantaneous modification by dust devils captured as they scurry across the dusty landscape. The symmetry of the vortices created by small Saturnian moonlets, and the vastness of Jupiter’s weather patterns bring the unifying physics of matter and fluids into my ken.

This fires my enthusiasm and makes me seek ways to explain using analogy and local examples, and these are objects in my cosmic back yard. The Hubble Deep Field image releases the mathematics of humungous and the statistics of other worlds around other stars. Mind numbing, and humbling.

So I build little robots, show meteorites and tektites, symmetrical young impact craters on the Earth and the Moon and the smallpox of ancient scars on parts of the Earth’s planetary crust that are hundreds of billions of years old. And I use my enthusiasm for these stunning things to light a fire in young people. We run special shows for nursery age children, as I agree with the Jesuitical injunction to catch their enthusiasm when they are young. But I must stop now, lest my short note becomes a novella.

My final message to you all is that you cannot do any wrong by offering yourself to serve as an officer of IPS. We are a very broad church, and have many opinions and sects, but in my view we are all consumed with the same passion: excellence of communication.

My time in office has been enriched by my fellow officers and friends, first amongst equals must be the national treasure known to you as Lee Ann Hennig, IPS secretary. Cherish her contribution, it is hyper-important. She is abetted by Mr IPS Finance, Shawn Laatsch, and their stable foundation is the bedrock on which presidents are made to look good. They save us from blunders and promote decisions, edicts and much common sense. My thanks and compliments on a job done better than well, I would say it is exemplary.

I also must mention the collective wisdom of many past presidents, whom I choose not to name, as to miss any out would be unintentionally invidious. I have valued their wisdom, advice and background knowledge.

And lastly, the rank and file of the IPS membership. What general in the past was blessed with the breadth of knowledge, the willingness to share and collaborate, and the sheer good humouredness of this happy band of brothers (and sisters) all striving for what I have tried to enunciate here. And Council members, if you have not already thought of it, think how you might offer to serve as an officer of the IPS. Actions are much more effective than good intentions.

Thanks to you all for the experience: it has been salutary and hugely rewarding for me.

Dr. Tom Mason
Armagh Planetarium
College Hill, Armagh BT61 9DB
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Background & First-Light photograph of starfield by Konica Minolta’s GEMINISTAR III
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Jim Gavio
Erie Planetarium

The Erie Planetarium’s early history started in the 1950's. The Junior League of Erie thought that the Erie Public Museum, which was a Natural History Museum, should have a planetarium.

The Erie Public Museum itself was started in the late 1800's and had acquired a large collection of artifacts from around the world. In the 1940's it was relocated from the public library to one of the largest mansions in the city, which was donated to and run by the Erie School District.

A delegation from Erie was then sent to the Cleveland Natural History Museum to gather information and see a planetarium first hand. After a few years and much planning, it was decided that a Spitz A2 would then be installed under 20-ft dome in the carriage house of the mansion/museum. A 20-ft dome was the largest that could be used.

The grand opening of the new Erie Planetarium was in 1959, attended by Mr. Armand Spitz. The doors opened to the public in the winter of 1959-60.

The Erie School District operated the planetarium for about 40 years. During the 1970's the mission of the museum changed to become the “Erie Historical Museum,” and also around that time, in 1969, the planetarium exchanged its A2 Spitz for an A3P.

Currently, the Erie County Historical Society operates the Museum and the planetarium, which is now in its 52nd year.
also has a group on the website. We anticipate other IPS Committees to set up group areas as well. Groups have a number of communication tools available to them, including e-mail lists and areas to post documents.

If you are a committee chair or member of a committee and have ideas for adding material relevant to your committee, by all means form a group. Feel free to contact me about how to put material on the IPS website.

I’m currently in the process of loading IPS publications into the Resources area. Soon to come are complete archives of the Planetarium, archives of directories, special publications and reports.

It’s your website, and you can help determine what it has in it! If you are looking for a way to participate in IPS in a new and meaningful way, consider helping with the website.

You can join the IPS Web Committee (contact me) and be in charge of any part of the website that is of interest to you.

Or, start a totally new area of the site. You can start a discussion forum or, if you are on a committee, form a group for the committee and start conducting discussions online right on the IPS website.

So take a spin on the IPS website—www.ips-planetarium.org. See what’s there and while you’re doing that, think about what you’d like to see there in the future. Things I already know we could use more of: multimedia. The site is rich in a sense, but not yet what it could be, especially for a planetarium organization. I welcome suggestions and feedback. And, of course, help.

(Rio Fulldome, continued from Page 46)

tent from all over the world. That was the Rio ShowDome 2012. We had more than 100 people attend our sessions!

The whole team (actually, three people, one of which our brave intern Rafael, co-author of this paper) was completely dedicated to the task of slicing and encoding over 15 terabytes of data using a single computer. By the end of the week, we had shown to our audiences productions from the U.S., France, the Netherlands, Japan, England and Brazil. And we would like to thank all the producers that sent us hard drives with content for our event: SkySkan, Mirage 3D, NSC Creative, Clark Planetarium, and the nice folks from DomeFest.

This is what we presented during that week: Awesome Light 1, 2 & 3 (Sky-Skan); Cell! Cell! Cell! (NSC Creative); Hayabusa: Back to the Earth (Goto Inc.); Perfect Little Planet (Clark Planetarium Productions); Natural Selection (Mirage 3D); Planètes (RSA Cosmos); Two Small Pieces of Glass (IPS/Imiloa); and two of our own productions: Céc historias e estrelas (Fundação Planetário da Cidade do Rio de Janeiro); and O Aniversário do Pingo (Labareda & Fundação Planetário da Cidade do Rio de Janeiro).

We also showed some short clips, like the IPS 2012 Introduction from Mirage 3D, some material from DomeFest, and a few trailers from various producers.

So, coming full circle to the beginning of this article: Rio de Janeiro is a beautiful tourist destination. In February (or sometimes March) we have Carnaval. And now, in September (or October) we have the Rio ShowDome. We know our planetarium event is not in the same league—yet—but we are giving you a brand new reason to visit us.

Constitution Matters

Secretary Lee Ann Hennig reported that revisions to the Standing Rules Appendix C: Conference Guidelines, which were approved by Council via electronic vote since the 2011 Council Meeting, were incorporated into the document. Additional wording regarding other revisions will be discussed by Council in September.

Unfinished Business

A Survey of the Membership will be drafted and passed to Council for comment and approval in September.

New Business

There was no new business.

Project Reports

Shawn Laatsch reported on the status of the production and distribution of a short (6-8 minutes) fulldome and traditional program “trailer” relating to light pollution. Versions in different languages are being prepared.

For the Good of the Order

President Dave Weinrich thanked Council for their dedication and attention to their work on behalf of the membership.

With business completed, Jeanne Bishop moved to adjourn the meeting, seconded by Patty Seaton, and approved by Council.

Respectfully submitted,
Lee Ann A. Hennig
Executive Secretary, IPS
July 22, 2012

Council minutes, continued from Page 35

low us more flexibility and options for membership that the previous situation. Alan and Treasurer/Chair Martin George announced the nominees for President Elect, and all of the candidates for IPS office presented statements supporting their candidacy. The nominees for the office of President Elect are: Gail Chaid, Paul Knappenberger, Marc Moutin, and Joanne Young

(Rio Fulldome, continued from Page 46)
NEW Fulldome shows from the makers of *We Are Astronomers* and *ASTRONAUT*

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I had fun pulling the ideas for this edition’s education article from my idea wall. Not because they are horribly profound, but because they do a great job of catching the student’s interest and guiding them to deeper understanding.

However, I first have a little education business to cover. At IPS 2012 I collected a great deal of information from participants at the Education Committee Panel, on topics covered and areas that are lacking in support.

One of the areas that I noticed was a lynchpin to many of topics was vocabulary and terminology. I met with our school district’s literacy and language guru and she helped create this list of instructional strategies. Many of the strategies are able to be done in the planetarium, but others may work best as pre- and post-visit activities.

- Marzano’s Six Step Vocabulary
- Think aloud
- Reciprocal teaching
- Note making and graphic organizers
- Preview of text features
- Preview of text structures
- Question-Answer-Relationship
- Comparison matrix
- Nonlinguistic representation
- Oral discussion
- Quick writes
- Summary writing
- Think-Ink-Pair-Share
- Structured writing
- R.A.F.T.
- Analogies and Metaphors

This is a great deal of information to be included in a single article (a 5-page article would make Sharon very cross with me), so I am going break it up into smaller chunks addressing two or three at a time.

- **Calendars and time**

This is a fun way for the students to make a personal connection to a topic, and a couple of my teachers have taken the stories back home and read them during the school announcements.

- **Moon phases**

I start the lesson with SkyTellers’ moon phases section (www.lpi.usra.edu/education/skytellers/moon phases) up to the science explanation. This first act of the show is the Native American story “The Girl Who Married the Moon.” At the end of the act I have the students write their own story for why we have the phases of the moon. You get some interesting stories, like “The moon is made of cheese and is the center of an age-old battle between the black rats and white mice.” The story went on to explain that the phases are the moving battle fronts, and it keeps repeating because mice and rats are not that bright.

Here’s another:

- The man in the moon is a real person, and he is the custodian for the moon. Everyday he walks all over the moon cleaning the dust in to piles. The cleared off areas are the mare. He digs holes all over to see how deep the dust has gotten. His biggest problem is keeping all the light bulbs working. They are always burning out and he only has time to fix one at a time. Once a month he gets all the lights on, but that only lasts a couple of days. When all the lights are on and working he gets in a rocket and flies to Earth to pick up more bulbs. It takes two weeks to get back to the moon. The oldest bulbs burn out first so they always go out in the same order. When he gets back to moon all the bulbs have burned out and he has to start over again.” –I.B. 8th Grade

The most popular grouping the last couple of years has been days are grouped to weeks, weeks to months, and months to years.

However, you may get a variation of this sequence, such as when I had a group insert “months are grouped into seasons and seasons to years.” This is perfectly fine and you can use this as a connection to other vocabulary, but an interesting question to pose to students is “How many days are in a week? Does it ever change?” The students will be confident in their answer that there are seven days in every week.
Next: “How many days are in a month?” This is when the students will go just a little nuts, you will have a divided camps saying 30 or 31 with a few saying 28 except on leap year. You can now have a couple kids go and check the web for the reason for the difference in length of month, or leave that as a future expansion activity.

I like to use this point as springboard for them to be posed with the question “What would a calendar look like if you were to design it?” I then have the students draw names from a hat of other calendars, such as Sun Dagger, Egyptian, Chinese, Hindu, Islamic, Jewish, Aztec and Greek.

They don’t have to become experts, but will need to make a quick informational flyer for the calendar. This gives them opportunity to compare different calendars quickly, including some that have months that are the same length and others that have months with three weeks each and a 5-day holiday at the end of the year.

A resource book I have the students check out is *Echoes of the Ancient Skies: The Astronomy of Lost Civilizations* by E.C. Krupp (Dover Publications, 2003). It is definitely upper level reading skill, but the students are able to get a great deal of information from specific passages on their topic calendar.

I like to mention that not all calendars are small enough to be carried in your pocket, and some are large and meant to be used by many people at once. Here in Nebraska we have a replica of Stonehenge called Carhenge (www.carhenge.com), and when I ask my students about monuments that can be used as calendars there is at least one student in each class who has made the trek to see this car-based version of Stonehenge.

The second most popular is Chichen Itza’s serpent shadow, but that is because it was mentioned in social studies.

After they are familiarized with the different types of calendars, I present them with the rubric for this project.

You will have some students model a massive variety, from 3-day weeks (more weekend time per year) to 10-day weeks (12 months with three weeks each and a 5-day holiday at the end of the year).

Some will explore 3-dimensional representations, such as a solar calendar on the equator that looks like the Sun Dagger.

Another student was very interested in how the sun rises at specific locations at Stonehenge and decided to move it to the equator and make heath-stone a large grooved stone in the center. Both of these animations were collaborations with the students after they built physical models; the Sun Dagger was made of toast and Nutella® so it did not hold up well.☆

Use each three letter group once per blank to spell the name of a category and some of its members.

**Triad Categories 2**

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**by Adam Thanz**  
(Answers on page xx)
AAM’s big tent

We visited Orlando in November for the IAAPA Expo and attended Museum & Science Center Day. IAAPA (International Association of Amusement Parks and Attractions) has long hosted the largest trade event for the attractions industry, and in the past 10 years has expanded its reach beyond the realm of parks into educational attractions and museums. A Zoo & Aquarium Day is also part of the program.

This year’s Museum & Science Center Day had a completely full house. Among the attendees were designers, architects, media producers, economic analysts, event producers, exhibit fabricators, museum operators and theme park operators.

The opening address was from Ford Bell, president of the American Alliance of Museums (AAM). The organization recently changed its name, swapping out Association for Alliance. Why? Bell explained that the terminology change signaled a change in the structure of the organization, retooling itself to spread a “bigger tent,” be more inclusive. The intention is not just to add more members, but to deepen relationships with other groups having similar interests and magnify the visibility and lobbying power in the face of shrunken federal assistance.

Measurements

In a subsequent session, John Robinett of AECOM, which has done numerous attendance studies for museums and cultural institutions, showed ways to obtain meaningful statistics that can be used to make peer comparisons and examine such things as the differing behavior patterns of residential markets to tourist markets, the ratio of visitation to exhibit square footage, the operations cost per square foot (most museums come in about $80-$100 per square foot) and evaluate admission prices.

Robinett’s fundamental graph showed the declining attendance curve of the museum that fails to reinvest on a regular basis—he maintains that museums should follow the practice of successful theme parks by reinvesting yearly and taking a close look at how to maximize earned income (“retail performance is a missed opportunity for a lot of museums”), enhance the perceived value to the visitor and increase per-capita spending.

Satisfying the many

Ike Kwon, director of guest operations at San Francisco’s California Academy of Sciences (home of the Morrison Planetarium) talked about strategies that the museum had employed in order to maintain visitor satisfaction in the enviable position of huge attendance numbers.

Before the museum was rebuilt (the previous structure was damaged by earthquake), its average yearly attendance was 80,000, reported Kwon. “Now we do 8,000 in 3 weeks and are creeping up on 7 million attendance since opening [in 2008],” he said.

He illustrated the problem with an example from the planetarium: the bundled ticket option covers a visit to the Morrison, but throughput in the dome wasn’t sufficient to meet demand, meaning that some visitors would not get the full value of their ticket.

They analyzed the load/unload pace and created a shorter planetarium show to facilitate a 30-minute cycle. This adjustment was one of many implemented in a full-scale overhaul of operations with the goal of improving the guest experience, based on a model Kwon had learned in his days in the hospitality industry. The process relies heavily on input and suggestions from staff who deal with day-to-day issues.

Know your value

Guy Labine, CEO of Science North in Sudbury, Canada, talked about how the museum used the results of an economic impact assessment conducted 5 years ago to attract more government funding and more than double the proportion of earned income relative to total budget (from 30% to 70%). The study revealed the true extent of the museum’s role in the community and of its contributions. “We found that Science North is a main driver of the city’s economic tourism engine,” he said.

Hayden takes fulldome honors

Held on alternate years with the Jackson Hole Wildlife Film Festival, the JHWFF Symposium 2012 took place at the Denver Museum of Nature & Science on Sept 5-7. Sufficient fulldome submissions were received for the new Science Media Awards to create a discrete category, Best Immersive-Fulldome, which was sponsored by Global Immersion.

Finalists were Dynamic Earth: Exploring Earth’s Climate Engine (Spitz Creative Media, the Advanced Visualization Lab at the National Center for Supercomputing Applications, NASA’s Scientific Visualization Studio, Thomas Lucas Productions and Denver Museum of Nature & Science) and Cell! Cell! Cell! (NSC Creative and INTECH Science Centre and Planetarium). The winning title was Undiscovered Worlds: The Search Beyond our Sun (Charles Hayden Planetarium at the Museum of Science, Boston). The show is about the discovery of exoplanets and the subsequent redefining of our understanding of planets and solar systems, and the relative place of Earth in the universe.

IMERSA Fulldome Workshops & Summit set for Feb 13-17, 2013

The Denver Museum of Nature & Science will again be the setting for the IMERSA Summit, preceded by two and a half days of fulldome workshops, under the theme The Art & Science of Immersive Storytelling. Delegates are encouraged to plan for the full five days (Continues on Page 52)
Join a family of aliens searching for the perfect vacation spot in the solar system. Now available.

Contact Mike Murray at mmurray@slco.org
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if possible, as many of the workshop subjects and speakers will reappear in the Summit sessions, allowing for deeper levels of exploration and discussion.

Areas of focus will include sound design and audio, cross-platforming from fulldome to giant screen and vice versa, designing a fulldome curriculum in schools, scripting and story for fulldome shows, and setting up fulldome theaters as multipurpose spaces. There will be a series of curated screenings, a Fulldome Innovation Salon for networking, product demonstrations and content sharing, a Creative Video Lab and the IMERSA Fulldome Standards Committee will address audio as the next phase of its work. Workshops will range from beginner to advanced levels.

The Summit organizing committee includes Dan Neafus, Ryan Wyatt, Ed Lantz, Michael Daut, Mark Petersen, Mark Slater, Carolyn Petersen, Matt Mascheri, Jay Heinz, Ken Scott, Claudia Cumbie-Jones, Lance Ford Jones, Jane Crayton, John Jacobsen, Paul Fraser, Markus Beyr, Judith Rubin and Karen Roney. Please email info@imersa.org if you would like to volunteer in any capacity, or to inquire about sponsorship. Registration will be live shortly at www.imersa.org.

Creative immersion at LA event

On 22 September 2012, IMERSA co-sponsored State of the Arts 2012: AMPLIFY! an immersive symposium in the Vortex Dome at LA Center Studios in downtown Los Angeles. The keynote, “The Neuroscience of Creativity,” was presented by Dr. Robert Bilder of UCLA’s Semel Institute. Other speakers included Diana Winston, director of MARC Mindfulness Awareness Research Clinic at UCLA, who led the audience in an exercise in creativity and mindfulness with Michael Perricone playing Tibetan bells and Joanne Warfield performing fulldome visual imagery.

Thanks to sponsor support from Zeiss, IMERSA presented an evening fulldome showcase featuring the premiere of “Blue Apple,” a dome ballet created by collaboration between choreographer Stefan Wenta and visual artist Audri Phillips, followed by “BollyDoll,” a multifaceted performance created and performed by visual artist and singer Amrita Sen with composer and musician Anthony Marinelli.

New FDDB website

Dario Tiveron reported 9000+ visits from 73 countries in less than 24 hours since the new version of FDDB.org (the Fulldome Database) went live on 9 November. Private companies, planetariums, independent filmmakers, students as well as anyone else can freely add their content to FDDB. With more than 200 shows listed - and more being added every month - FDDB is achieving its goal to provide a comprehensive and accurate online resource of fulldome content. Dario Tiveron, based in Padova, Italy, is a former science project director of a digital planetarium.

Upcoming Events

‘Imiloa Fulldome Film Festival, 7-9 February 2013, ‘Imiloa Astronomy Center, Hilo, Hawaii. An international line up of 25 new digital planetarium films will be showcased. All entries to the festival will be new planetarium fulldome content since October of 2012. www.imiloahawaii.org/168/IFFF2013

IMERSA Fulldome Workshops & Summit, 13-17 February, Denver, Colorado, USA; see description above.


Immersive Film Festival, IFF ’13, 3-5 May 2013 at Centro Multimíeis Espinho, Portugal. Navegar Foundation invites producers, animators, filmmakers, artists, students, teachers and planetarium professionals to participate. The competitive section will award the best in fulldome productions by juried selection. iff.multimeios.pt

AAM Annual Meeting & Museum Expo, 19-22 May 2013, Baltimore, Maryland, USA. www.aam-us.org

SIGGRAPH 2013, The 40th annual conference and exhibition on computer graphics and interactive techniques. 21-25 July, 2013, Anaheim California USA. x2013siggraph.org ☆

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**Bugs help tell the story of trees**

From the creators of Kaluoka‘hina and Realm of Light comes The Life of Trees, a high-end animated fulldome show telling a charming and enduring story about trees and conservation.

In The Life of Trees, a cheeky ladybug called Dolores and a quirky firefly called Mike take the audience on a journey of exploration into the wondrous world of trees. As seen through the perspective of insects, the film reveals the magic of the microcosm.

On their excursion, these two creepy-crawlies zip around a tree, and in doing so, playfully learn its secrets: How do plants get their food from the sun? How do they grow? How does water get from the roots to the top of the crown? And how does all this make life on our earth possible?

The producers describe The Life of Trees as a new kind of fulldome show. “By following the concept of edutainment, the plot intertwines entertainment with education. Exciting and informative at the same time, this combination creates the best learning effect.”

The United Nations declared 2011 as the International Year of Forests, which prompted the production of the program.

To this end, the World Wildlife Fund (WWF) was gained as partner in Germany. The film is dedicated to the global conservation of trees, and aims to support the protection of the environment by giving insight into the extraordinary connectivity in nature. With its impressive presentation of complex processes, the program is not only suited for children over the age of 6, but also is a fascinating and educational joyride for adults.

The adventures of Dolores and Mike came to life in the studios of Softmachine, the third production from the company in Munich. Over the course of over one year, they created one of the most ambitious 360° film project ever. Its global premiere took place in October at the Planetarium of Hamburg.

- Christoph Brandl

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Still from The Life of Trees. Courtesy Softmachine.
THE MOON

FROM THE PRODUCERS OF The Little Star That Could

- Observe the moon's surface and how its appearance changes in the sky.
- A three-part modular program designed for live interaction.
- Meets National Science Content Standards for grades K-4

Joanne Young  407-859-8166  joanne@av-imagineering.com  www.av-imagineering.com
Preserving manuscripts that preserve the roots of African astronomy

Sharon Shanks  
**Planetarian** Editor

The Arabic world preserved the foundations of today’s astronomy at a time when it could have easily disappeared after the fall of the Roman Empire. It was given back, along with their own learning, when the darkness lifted. Contributions to knowledge from people like Copernicus and Galileo, and all the others upon whose shoulders we stand, would not have happened without the assistance of African Medieval astronomers.

*The Ancient Astronomers of Timbuktu* beautifully tells this story. The documentary film, released in 2009, recounts how Timbuktu was the center of learning in West Africa, where it sat in the midst of trade routes and on the edge of the Sahara. Today, it houses treasured hand-written manuscripts that are providing the basis for research to understand how and why astronomy survived.

This family wealth, handed down through generations, dates back to the early 11th century. Many of the manuscripts are still held by private families, some in locked chests and others in private museums. Massive efforts are underway to conserve and preserve these fragile leather-bound documents, which are under attack by time and the climate’s sand and high temperatures.

Dr. Thebe Medupe, arguably Africa’s best known astronomer, is featured as he travels across the continent looking for ancient documents and teasing out their connection with astrology, the roots of astronomy.

Astronomy and astronomical observation survived because of the large country’s Muslim population. Islamic rituals require prayers at certain times while facing in a certain direction, both established by the position of the sun and the length of shadows, by angles measured by quadrants, and other celestial means. Holy days are based on a lunar calendar; the time at night is measured by the movement of the 28 Lunar Mansions through the ecliptic. What’s more, observations of the planets led to a desire to know the mechanics of the solar system, a “struggle to know one’s place in the great cosmos,” Medupe says in the movie. Trying to explain and understand retrograde motion in an Earth-centered universe led to an explosion in mathematics and clues that led to placing the sun in the center of the solar system.

The cinematography is beautiful. The camera’s connection to the people telling the story brings them alive; subtitles are provided when necessary but are not universally used. I found that listening to a discourse in a language I did not understand did not detract from my understanding of the message.

And the message? That knowledge must be preserved, and a new era of understanding astronomy in Africa has begun.

You can learn more about this film at its website, www.scribesoftimbuktu.com. It was produced in English and subtitled in French and Arabic, and is available for purchase from the Johannesburg Planetarium at the University of Witwatersrand in Johannesburg, South Africa.

I’ve loaned the movie for use in my university’s Black Studies program, and watch it from time to time for my own edification. It reminds me that all knowledge, like all people, is important.

on.fb.me/PlanetariumTweets

**PARTYcles**

**I was abducted!**
**You call it what you want...**
**No abduction nonsense!**
**I’m sorry, Ms. Shonke.**

**You were certainly not!**
**Look around! This is the Planetarian!**
**The official Journal to the IPS!**

**You interacted with a photon!**
**There was this flash of light and then I was gone.**
**I say abduction!**

**It’s called ionization...**

**Alex Chernen**

**The official Journal to the IPS!**

**Look around! This is the Planetarian!**

**I was abducted!**

**You call it what you want...**

**No abduction nonsense!**

**I’m sorry, Ms. Shonke.**

**You were certainly not!**

**Look around! This is the Planetarian!**

**The official Journal to the IPS!**

**I was abducted!**

**You call it what you want...**

**No abduction nonsense!**

**I’m sorry, Ms. Shonke.**
The moment science and wonderment merge.
This is the moment we work for.

We have been bringing the stars down to earth since 1923. Millions of people have discovered the magic and fascination of the night sky in planetariums from Carl Zeiss. With solid technology and simple operation, we aim to play our part in ensuring that science and wonderment continue to merge in the future.

www.zeiss.de/planetariums
International News

Lars Broman
Teknoland and Strömstad Academy
Stångtjärnsv 132
SE 791 74 Falun, Sweden
+46 2310 177
Lbr@teknoland.se, lars.broman@stromstadakademi.se
www.teknoland.se, www.stromstadakademi.se

The Swedish fall has this year been disappointing from an astronomical point of view, with clouds most of the time covering the evening sky. No stars, no planets, no aurora borealis to watch.

It is then comforting to sit and edit the International News column and take part in so many exciting things that happen all around the globe. Of special interest is the news from Ukraine. The Ukrainian Planetarium Association was an IPS Affiliate Association until some years ago, when the number of Ukrainian IPS members dropped. But now, membership is on its way back up and activities also are increasing in other cities than Kiev. Thanks to Nataliya Kovalenko for your Ukrainian news, presented in a special section. I hope UPA soon will be affiliated to IPS again.

The International News column is built on contributions from IPS Affiliate Associations. If you have news that you want colleagues worldwide to read, please send them to your IPS representative (see page 3). Their deadlines are 1 January 2013 for Planetarian 1/2013 and 1 April for 2/2013, so they need your news ahead of those dates.

Those of you who want to contribute news from parts of the world where IPS has no Affiliate Association are more than welcome to send it to Martin George, martingorge3@hotmail.com.

For contributions to this International News column, I sincerely thank Agnès Acker, Vadim Belov, Bart Benjamin, Ignacio Castro, Gail Chad, Alex Delivorias, John Hare, Ian McLennan, Loris Ramponi, Aase Roland Jacobsen, Jenny Shipway, Christian Theis, and Michele Wistisen. I wish you and other representatives back with news for upcoming Planetarian issues.

Association of French-Speaking Planetariums

The rise of small digital planetariums has created a strong interest in mastering new technologies for creating content. An annual meeting is being organized each December for French-speaking planetarians to strengthen the bonds between users involved with Nightshade, the powerful open-source planetarium software. It will gather 30 planetarians from France, Belgium and Switzerland and interested Italian and Spanish planetarians as well. It is linked this year with the Stratoscript creation contest.

The annual Stratoscript Compendium Ring contest involves countries from around the world sharing their best creations. The competitors receive, at the end, all the scripts of the people who participated and the right to use them in their planetariums. The winners, sorted in different categories, receive small shows, collections of scripts, or fulldome videos for their dome. It’s open to everyone using Nightshade; the deadline this year is 12 December 2012.

The planetarium show Water, a cosmic adventure, produced for the 50th anniversary of the European Southern Observatory by APLF in collaboration with Planetarium Hamburg, is a very successful international collaborative production.

It is an unique combination of real fulldome footage with actors, using the new Red Epic camera at Paranal Observatory, and state-of-the-art computer animations created by Didier Grosjean, Masterfilms, in Toulouse, along with beautiful music and the wonderful voice of “water” telling its own story.

Trailers of the show can be found on the ESO website at www eso.org/public/outreach/50years/water cosmic adventure.html. For information, please contact aplf planetariums@orange.fr and agnes.acker@astro.unistra.fr.

The premiere of the 50th anniversary ESO show took place in September at Planetarium Hamburg, where it is called Der Stoff der von den Sternen kam (literally, The Stuff that Came from the Stars), under the direction of Thomas Kraupe, IPS president-elect, with many other planetarium directors from all over Germany and astronomers of the Astronomische Gesellschaft being present.

The show was introduced by a live-link to ESO’s Public Information Officer Lars Lindberg Christensen at the ESO Headquarter in Garching, and a special welcome via Skype by Prof. Agnes Acker on behalf of APLF, highlighting this co-production, which made a strong impression on the guests at this launch event in Hamburg.

The show is now playing on a regular daily schedule in Hamburg and also in other German theaters, like in Osnabrück, using the German soundtrack provided by Planetarium Hamburg.

The French premiere took place in October at the 20m Astralia Planetarium at La Cité de l’Espace in Toulouse, with the assistance of 520 visitors and the presence of Norbert Hu-
trophysics, cosmology, and planetology done by Toulouse researchers.

**Association of Mexican Planetariums**

The National Council of Science and Technology sponsored the 19th National Science and Technology Week throughout the country in September, with many science museums, planetariums and educational institutions participating. In Mexico City’s downtown main square, a large science fair was installed, drawing thousands of children and youths who were attracted to its many hands-on experiments, workshops, lectures, science demos and other activities, many related to astronomy.

Other news worth mentioning is that Chiapas, Mexico’s southernmost state, now has three digital projection planetariums: Tapachula, a Digistar 3 in a 10-m dome, inaugurated in 2008; Tuxtla Gutierrez, a Digistar 4 under a 15-m dome, still pending inauguration; and Comitán, with a Digistar Outreach and an 8-m dome.

Also in the news, Mexico City’s Papalote Children’s Museum has installed a Digistar 5 Projection System, to be inaugurated probably this year.

**British Association of Planetaria**

The British Association of Planetaria’s annual conference took place at the National Space Centre, Leicester. This was a superb venue, having a 17-m digital dome, great organization, and technical expertise from in-house production team NSC Creative.

The conference went extremely well, with particularly good feedback for a session where mobile dome operators shared best practices and a session where Pete Basset (Astronomy Roadshow) showed footage of satellites recorded using image-intensification binoculars. The legendary Ray Worthy, now retired from his mobile dome business, regaled us with entertaining anecdotes to remind us to “keep our feet on the ground” (see page 6 for his full talk) and appreciate that not everyone can leap quickly to understanding new concepts.

The Silly Presenter Game closed proceedings with a chance for members to show off their presenting style and ability to talk total codswallop (points deducted for technical accuracy) under an eccentric and ever-changing sky. Congratulations to the winner, Richard Lake (Polestar Planetarium).

Generous sponsorship from a record eleven vendors allowed us to retain our traditional absurdly low registration fee. Thanks so much to all involved, and especially to Zeiss, who treated us to the famous local curry, and to Sky-Skan, who sponsored the Saturday night meal, where delegates were challenged to build space-stations between courses.

At the business meeting, delegates agreed to run a members training day in spring 2013, and for BAP to provide a bursary to help those on low incomes to attend such an event. They also voted to create a “Special Contribution Award,” awarded to Glenn Smith (as an individual) in acknowledgement of his strong and continued support of BAP and the planetarium community in the UK and Ireland over the past years.

The Centre for Life in Newcastle-upon-Tyne has been working with comedian-in-residence Helen Keen on a fulldome show called *Moonstruck*. Helen is an excellent performer known from her BBC radio series *It IS Rocket Science*. She narrates in a rapid-fire style in what the local press headlined as “One giant laugh for mankind.” Illustrator Dr Tom Whyntie is a particle physicist with a side-line in cartoons that deftly communicate complex ideas. This mix of fun and solid science is an innovative style of show that allows the audience to learn more through laughter.

NSC Creative has produced two shows this year with funding that offers free licensing within the UK. *Cell! Cell! Cell! and We are Aliens* have taken the group-funding model of *We are Astronomers* (which was part-funded for a consortium) to a national level. We hope to see more shows with this funding model in future, as it offers excellent impact for funders but is also an enormous support for organizations who often struggle to afford licensing fees.

Daniel Hodgkinson (English student at Staffordshire University) completed a final year dissertation on the nature of mobile planetariums, achieving a first class honors and nomination for a graduate prize. It is thought that the dissertation titled *An Investigation into Immersive Video and Audio for Digital Domes* is the first in the country to study the mobile dome on an academic level. Covering a wide range of topics, including content production and sound set-up, it is hoped that the project has sparked interest in fulldome study for future students and members of the UK dome community.

**Canadian Association of Science Centres**

Montreal. As you read these lines, the new Montreal Rio Tinto Alcan Planetarium is nearing completion. The staff is eager to move in and start playing with all the wonderful new toys that it will feature: two 18-m domes, equipped with a Sky-Skan/Konica Minolta hybrid system, the other with a state-of-the-art full dome system, also from Sky-Skan.

The next three months will be devoted to training personnel to use the navigation systems and complete the production of their first show (produced by multimedia artists Michel Lemieux and Victor Pilon) so that staff are ready to greet Montrealers in their new home of the stars in the spring of 2013. Contact: Pierre Chastenay at chastenay@astro.umontreal.ca.

Winnipeg. The Manitoba Museum’s Planetarium has installed a Digistar 5 fulldome system, which opened in October 2012. Instead of replacing the existing Zeiss Mark V, they kept it in the planetarium “as is” and added Digistar 5 on top. While the focus is on fulldome video and new shows to the external world, initially the staff viewed this upgrade as a “transitionalph” system, getting the theatre into fulldome technology at a low price-point and preparing for a full refit in three to five years, which will include major architectural changes, tilted dome, and unidirectional seating.

The system uses two Projection Design F35...
projectors mounted on the central pedestal to avoid shadows from the fixed Zeiss) at a resolution of 2.5k. Site preparation, wiring, installation, training, and pre-opening events were accomplished in a total of 30 days (21 business days).

Despite being “too small” of a system for the 18.3-m dome on paper, the results are impressive. The images are bright and colorful, and the old dome seams are visible only during very bright, white scenes without motion. (They chose to not clean the dome, and it seems the dust helps to blend the dome seams somewhat.)

This transitional system was selected rather than waiting for the larger refit because of the time delay, the lack of available traditional shows for purchase, the non-availability of slides to feed the slide-based panorama and all-sky projectors, and the impatience of the production staff to “get on with it!” They also wanted to ramp up the production capability for full-dome shows so that they can contribute content to the planetarium community again after a production hiatus of several years.

The staff looks forward to increasing projector brightness and resolution in future upgrades, as well as moving from concentric seating to an epicentric, tilted-dome configuration. By ignoring conventional wisdom, they have entered a new era of planetarium experiences for their audience, and have proved the truth of the old Russian proverb, “Better is the enemy of good enough.” Contact: Scott Young at scyoung@manitobamuseum.ca.

**Calgary.** In May 2012 the Digital Dome opened at the new TELUS Spark Science Centre (www.sparkscience.ca). This theatre represents the third planetarium for Calgary, replacing the 1996-vintage Discovery Dome at the old and now-closed science center, which in turn had replaced the original Calgary Centennial Planetarium built in 1967. The latest theatre features a 246-seat, 23-m dome tilted at 25° equipped with an Evans & Sutherland Digistar 4 system. Bowen Technovation supplied the lighting and sound systems.

Calgary’s Digital Dome employs Sony T-420 4K projectors, configured in pairs north and south with a single east-west seam. Two projectors per screen allow for stereo 3D or for double brightness projection when needed. The theatre was designed with these massive projectors in mind, with air-conditioned rooms for both pairs of projectors incorporated into the cove. The Sony’s image quality has proven superb. A fifth projector, a 2K Christie Mirage, is used for special events and rentals when only a standard, though still impressive, image video is required.

Selecting the hefty 20,000-lumen Sony projectors was essential for the intended programming in the new theatre, which consists of a mix of live planetarium shows and rendered movies, with many titles coming from the large-format film community. The Digital Dome serves as both the science center’s planetarium and giant screen movie theatre.

The theatre opened with National Geographic’s *Wildest Weather in the Solar System*, complemented by a 20-minute live star show featuring the current night sky and an interactive tour of the solar system, making for a single 40-minute show offering.

Programmed buttons on the Digistar’s remote iPad controller allow the host at the front of the theatre to “fly” the audience to the solar system destination of their choice. Presenters come from the science center’s roster of energetic floor staff, who also present science demos and do exhibit gallery interpretation.

The single-ticket combination of 20-minute movie and 20-minute live show has proven to be the most popular of the initial show offerings. Also on the current schedule are the 40-minute large-format movies *The Last Reef* and *Tornado Alley*, both rendered for the Dome by E&S. All shows carry the same ticket price. Contact: Alan Dyer at alan.dyer@sparkscience.ca or Barry Thorson at barry.thorson@sparkscience.ca.

**Edmonton.** As many IPS members will now be aware, TELUS World of Science-Edmonton (TWoSE) has been put forward by the Canadian Association of Science Centres (CASC) as the official Canadian bidding city for the IPS biennial conference in 2016. Edmonton is one of three locations, including Toulouse and Warsaw, bidding for the 2016 event.

The first formal presentation about the 2016 Edmonton bid was given at the Baton Rouge IPS meeting by Steve Baker, chief operating officer of TWoSE, and Frank Florian, science director, as well as Ian McLennan as the project coordinator. Ian also acts as the CASC representative to IPS.

The final decision will be made by the IPS Council at its regular meeting in Italy in August 2013. A full account of all three bids will be included in the next issue of the *Planetarian*. Contact: ian.mclennan@gmail.com.

**European/Mediterranean Planetarium Association**

The Eugenides Planetarium in Athens, Greece, celebrated the Fall Equinox with a full-dome show featuring live musical improvisations by three young and much promising artist-composers of electronic music: Lunar Masma, Electroware and Medras. Public attendance was so large that on top of the three performances scheduled, a fourth had to be performed on the same evening.

On Monday 15 October, the planetarium (an ESO Outreach Partner Organization) participated in the worldwide activities to celebrate the 50th anniversary of the European Southern Observatory.

Invited speakers were Panos A. Patsis, acting director of the Research Center for Astronomy and Applied Mathematics of the Academy of Athens, who briefly introduced ESO to a packed audience, before giving the floor to Jason Spyromilios, the main speaker of the event. Psyromilios, senior astronomer at ESO and director in 2005 of the merged La Silla Paranal Observatory, captivated his audience with a presentation of the E-ELT, the European Extremely Large Telescope.

The very successful astronomy evening concluded with the official opening of The Awesome Universe-The Cosmos Through the...
Eyes of the European Southern Observatory. This is ESO’s stunning astrophotography exhibition that celebrates 50 years of ESO’s quest to explore the southern skies.

Two days later the Hellenic Physics Society honored Dennis Simopoulos, director of the Eugenides Planetarium and the recipient of the 1996 IPS Service Award, for his lifetime dedication in science education and the dissemination of science to the general public.

Numerous invited speakers from the academic and planetarium fields presented Dennis to the audience, each in their own unique way, including Tom Mason, IPS past president.

Also in October, the planetarium premiered its latest production titled Ancient Skies, and uploaded on its webpage, as customary by now, a guide book with the same title, which expands on the theme of the show.

Ancient Skies is a voyage through space and time to uncover the ideas and the knowledge that ancient civilizations had for the heavens. Invited speaker for that event was Professor Xenophon Mousas, director of the Astronomy Laboratory of the University of Athens and member of the Research Team of the Anti-Kythera Mechanism Research Project.

In November (and as the deadline for the 2012 doomsday nonsense approaches), the Eugenides Planetarium screened three performances of the Chabot Space and Science Center planetarium show Tales of the Maya Skies. The planetarium will celebrate the Winter Solstice with yet another fulldome show, this time with live music provided by the group Gravity Says I.

Croatia: In October, the digital planetarium of the Astronomical Centre Rijeka featured the programs Touching the Edge of the Universe and Kaluoka’hina—the Enchanted Reef. Besides watching the programs, visitors had the opportunity to attend the live presentation A Guide to the Dark Sky-Fall and enjoy the observatory during clear weather (once a week).

The centre organized a program for Children Week (2-6 October) with the live presentation Safari Through the Solar System and, for World Space Week (4-10 October), the 10-minute live presentation Artificial satellites in the service of humanity.

The centre, with the Croatian Association of Meteorology CROMETEO, organized a lecture by Ivan Toman, professor of physics and nautics from Zadar. He talked about the prediction of dangerous meteorological phenomena.

In November, citizens had opportunity to watch Mission: Mars and Planets in Sight, and on the Day of Science, 8 November, the centre organized the opening with CROMETEO called Meteorological Contrasts. The exhibition was open during one month for the occasion of World Science Day for Peace and Development.

December brings along new activities because of the holidays. The regular program for December once again includes Kaluoka’hina, which received support from the Croatian Ministry of Science, Education and Sports in 2012.

A new live presentation for schools and kindergartens is being introduced and featured every Saturday morning explaining the importance of energy from the sun for life on Earth and other information about our star. The centre is organizing a new exhibition for World Mountain Day (11 December 2012) presenting a live program about the Bethlehem star throughout the month.

Great Lakes Planetarium Association

Illinois. The Lakeview Museum of Arts & Sciences is now a memory, reborn on October 20 as the Peoria Riverfront Museum at its new downtown location. The new 12-m (40-ft) 186-degree dome was installed by AstroTec in June and began housing the Zeiss Powerdome Planetarium as it was moved in July and August. The latest version of Uniview and East Coast Control Systems LED cove lights were installed in August. The Peoria Riverfront Museum will be hosting GLPA and co-hosting the Illinois Association of Museums in October of 2013.

The William M. Staerkel Planetarium at Parkland College in Champaign celebrated its 25th anniversary in October. Dr. William Staerkel, Parkland's first president, dedicated the building 25 years ago this October. The celebration was muted by the recent passing of his widow, Mary Lou Staerkel, who supported the planetarium until her last days. In October, they premiered the digital remake of the first show that ever played on their 15-m (50-ft) dome, Odyssey. The planetarium's own “World of Science” lecture series commenced in October, with Dr. James Kaler returning in December for a talk on water in the universe.

The Cernan Earth & Space Center at Triton College hosted Vatican Observatory astronomer Guy Consolmagno as its “Big Event” speaker in September. GLPA members will remember Brother Guy as one of the featured speakers at the 2003 GLPA Conference in Cleveland. The Cernan Center staff continues its ongoing project to convert its collection of slide-based programs to its new digital, three-screen video system.

Indiana. Mitch Luman of the Koch Planetarium in Evansville reports that his institution recently received a donation of a very unique telescope, a 12-inch Questar, only one of 13 ever manufactured by the Questar Cor-
poration. The new telescope will be used at evening astronomical events held throughout the year.

Ball State University in Muncie has announced that they recently received a nearly $2.2 million contribution towards the $4.6 million construction plan for a new Ball State Planetarium. The new planetarium will feature a 16-m (52-ft) dome and a GOTO Chronos II Hybrid. The new facility should open in 2014.

Michigan. The University of Michigan Museum of Natural History planetarium continued its “shows every day” schedule through August. Director Matt Linke attended a pre-IPS workshop with SCISS in Baton Rouge to preview new features in the upcoming Uniview version upgrade.

The Robinson Planetarium at Adrian College recently completed a series of renovations that were funded by generous grants from the Maurice and Dorothy Stubnitz Foundation. Renovations in the spring were cosmetic and included the repainting of dome and walls, new flooring, and the installation of new Greystone seats by Ash Enterprises. This summer Ash Enterprises returned and installed a new stereo system and their new High Definition Warped Media projector. Re-opening occurred in August with new fulldome shows.

At the Eastern Michigan University Planetarium, improvements continued through the summer. A custom curved whiteboard was installed, and their 18x12-m (6x4-ft) smartboard is now wall-mounted. This arrangement frees up presentation space in the front of the room and results in a cleaner, less cluttered look. Soon to arrive are new planetarium-correct seatbacks from American Seating. The EMU Department of Physics and Astronomy was a co-sponsor, along with other regional astronomy clubs and planetariums, for the “Astronomy at the Beach” event at Kensington Metropark in September. This year’s keynote speaker was Michigan native and NASA astronaut Dr. Drew Fuestel.

Ohio. Most planetariums across Ohio were blessed with good weather for the Transit of Venus in June and held well-attended public events. At the Sidney Frohman Planetarium in Sandusky, Lois Wolf arranged a simultaneous feed from Hawaii in the planetarium and live viewing in the rooftop observatory. Mike Smith, an old friend and Boy Scout leader, kept things going in the observatory, while helpful Boy Scouts passed out commemorative cards and directed people to the domes.

At the Bowling Green State University Planetarium, Dale Smith, along with his student workers and faculty colleagues, ran a well-attended observatory open house for the Transit of Venus. Visitors saw the transit through 8-in telescopes on the outdoor sky deck and got a rare daylight look at BGSU’s half-meter reflector. The student workers ran the telescopes while faculty answered questions in the planetarium, where a live internet feed of the transit was shown.

At the Shaker Heights High School Planetarium, Gene Zajac, Bryan Child, Joe Marenz, and Kelly Jons organized a transit viewing that attracted 1,400 people. Thankfully, the skies cleared two minutes before first contact! They had about 2,000 individual viewers ready, along with telescopes and activities for children. In August, Joe and Bryan ran their annual space camp, with students learning about and building rockets, using the space bus, going to the Science Center, and doing a NASA challenge activity.

At the Ward Beecher Planetarium in Youngstown, recently upgraded cove lighting has been complemented by an upgraded sound system, with Ohio-based ChromaCove installing new LED lighting and computer control and Ash Enterprises installing the sound upgrade. Cosmic Castaways, the planetarium’s own fulldome production about gravitationally-ejected galactic stars, premiered during a fund-raising gala to local audiences in September. Dr. Pamela Gay narrates the program.

Wisconsin/Minnesota. At the Soref Planetarium in Milwaukee, GLPA’s own Cosmic Colors continued into the fall after a great response this summer. A new insert 3D projection that can show giant screen films productions was installed in September. The Soref Planetarium was awarded a grant from NASA’s Competitive Program for Science Museums and Planetariums for its CREATE (Creating Relevant Education in Astronomy through Experience) program. This three-year project establishes a new out-of-school program for underserved high school students. The Soref Planetarium will work with the Boys & Girls Clubs of Greater Milwaukee. One of the features of CREATE is having students create their own planetarium show after six months of astronomy immersion.

In September, the Charles Horwitz Planetarium celebrated the Apple Harvest Festival by presenting 3-2-1 Blastoff.

In October, the UW-LaCrosse Planetarium presented the program Let There Be Night. GLPA’s Cosmic Colors was shown in November. Each Friday during first semester, the planetarium offered the Album Encounters multimedia light and laser shows.

Italian Association of Planetaria

In September, the Ignazio Danti Planetarium, at FIT, A. Volta in Perugia, participated in the International Observe the Moon Night event with a performance titled The Moon Seen with Galileo’s Eyes.

At the beginning some members of the staff—Simonetta Ercoli, Marco Magliocchetti, and Silvia Mazzoni—read a piece taken from Sidereus Nuncius by Galileo Galilei and a dialogue from Galileo’s life by Berthold Brecht in front a reconstruction of Galileo’s telescope.
There are more than 360 Digitarium® systems in use around the world. Why?

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fixed on a Newtonian telescope. Then another member, Abdelhalim El hilali, explained the differences in structure and the kind of images which could be observed using the two instruments.

Walter Risolo showed a PowerPoint presentation about images taken from some astronomers from the 1600s to today, introducing a virtual exploration of our satellite by Virtual Moon Atlas Expert. In this way the public was prepared to observe the moon directly using various instruments: their eyes, the Galileo telescope, astronomical binoculars and two Newtonian telescopes (100mm and 150mm).

At the end Luca di Bitonto ran a projection in the dome to show stars in a dark sky (outside there was light pollution) and explain the particular day, which was the September equinox.

The participants were enthusiastic, especially the children, and they wrote many comments in the planetarium’s memory book.

In August, a group of 15 peoples from Astronomical Observatory of Laval, France visited the Museum of Constellation in Lumezzane, and in particular Serafino Zani Astronomical Observatory. The two observatories have collaborated and to promote the day for planetariums, including those outside of Italy.

In order to improve the participation of small facilities and young planetarians during the annual meeting of Italian planetariums, the National Association PlanIT intends to support, with a prize, communications presented at the occasion of the National Conference in planning for April 2013 in Cagliari. The people interested in participating in the contest need to send their complete presentation before the end of the year. A committee, established by PlanIT will select the winner that receives a financial help to cover travel and hotel expenses.

PlanIT plans a revised census of Italian planetariums, collected through a data form, that will also be the information published in the IPS Directory. In this way the national census of Italian planetariums will be useful also for the next issue of the Directory. Loris Ramponi suggests that it would be a good choice that each national list of planetariums reproduces the same structure of IPS data form. The same result could be very interesting using, at international level, the same program to prepare a detailed word map of planetariums around the continents. Each regional or national planetariums association could update the part of the map concerning the respective geographic area.

Nordic Planetarium Association

Carsten Andersen from Sjärmenkameret at Bellahøj Skole in Copenhagen has great news. Thanks to kind donations from 15 Juni Fond- en Friluftsrådets Tips og Lottomidl, it has now got a digital Starlab projector, so school classes in the morning can watch stars and planets and “travel” in the universe.

They can also choose to build a Galileoscope and borrow this telescope for some months so that they can study the night sky at home. Guidelines are to found at www.boernafgalileo.dk and at www.boernafgalleo.dk/english.htm. Here you can also find experiments in English. For more information please visit Sjärmenkameret at www.bella-hoejkk.dk.

At this year’s Summer School 2012 at The Steno Museum, University of Aarhus, 30 students from grades 4 to 6 spent the first week of their summer holidays learning about science. The attendance to this year’s school surpassed expectations; the possibility to sign up electronically was only open for 7 minutes before the course was over-subscribed.

Like the previous years, the purpose of the summer school was to build upon the students’ interest for science as well as to give them a social experience and an impression of what happens behind the yellow walls of the university. This year the topic was designing their vacation center on space. For a week the students had opportunities to work in depth with microgravity, a rock planet, a gas planet, temperature, air pressure, wind speed, and stars.

This was done in collaboration with Center of iNANO and Department of Computer Science students. At iNANO the students...
worked with solar cells capable of delivering electricity to their vacation center. Among other things, the students measured the output of the solar cells in order to find out how efficient they were.

At the Department for Computer Science, the students worked with programming LEGO® robots that were driven by electricity from solar cells. The robots had various tasks at the vacation center, such as transporting guests around, cleaning the solar cells and helping to run the aqua park.

The museum guides worked with astronomy and physics at the museum and in the planetarium, including how to find exoplanets. A LEGO construction was used to illustrate how this can be done. In this way it was possible for the students to get an impression of how scientists work in practice. In addition to this, they made spectacular experiments with water rockets.

Pacific Planetarium Association

The Lawrence Hall of Science in Berkeley, California, is showing a revised version of the Transit of Venus show originally produced by the Great Lakes Planetarium Association in 2004. True to the tradition of Lawrence Hall of Science, it was adapted as an interactive program with audience participation activities. The program was converted to run on the DigitalSky 2 fulldome system. Using a light pole and a volunteer “Venus,” the entire audience acts as the Earth, rotating on their own axis to observe Venus rise and set in relation to the sun’s rising and setting. It is a kinesthetic model of Venus as Morning and Evening Star.

LHS is the lead institution on the Education and Public Outreach for the Kepler Mission, so other programs have been developed to help audiences relate to exoplanet detection. The programs have been well received. Contact: tkomatsu@berkeley.edu.

John Young from Reuben H. Fleet Science Center in Balboa Park, San Diego, California continues to work with the new equipment installed and explained in the blog spacetheater.wordpress.com. In-house productions include Worlds of the Solar System; other programs include Clark Planetarium’s Secret of the Cardboard Rocket and Rock on Demand. Contact: johnyoung@rhfleet.org.

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The Mission of the Vega continues its tradition of being a NASA Regional Educator Resource Center. This time the NRERC and the Las Vegas Astronomical Society will provide training in the use of telescopes. The telescopes were obtained through a generous grant from the Wells Fargo Foundation. The grant provided financing for 10 telescopes for the Telescope Loan Program designed to foster scientific literacy and to stimulate interest in astronomy and promote excitement and discovery for children in Clark County, Nevada. Contact: drdale@nevada.edu.

West Valley College Planetarium in Saratoga, California has been re-modeled with the help of Phil Groce, consultant, and John Hare and Jason Statham from Ash Enterprises. There were many problems to overcome as Benjamin Mendelsohn, planetarium teacher at West Valley and PPS President, found out, as the many teams of contractors and workers had difficulty coordinating. Mark Trotter and Mike Grznar from Bowen Technology directed the reinstallation of LED lighting and installation of a new sound system and conducted training of the upgraded control system. The planetarium is ready for the new classes. Contact: benjamin_mendelsohn@westvalley.edu.

Rocky Mountain Planetarium Association

Rod Kennedy has reported on how community collaboration brought a new audience to Wyoming’s Casper Planetarium:

Today’s planetariums are always trying to come up with the next big thing. From 3D planetariums show to audience participation to laser shows, planetarium directors are always looking for something amazing to draw in audiences.

Sometimes the price tag for amazement is high, in some cases prohibitively high. However, there is a unique audience experience that harkens back to the days when technology was simpler, and entertainment centered around the smooth sounds of the human voice. The Casper Planetarium calls this experience the “Theatre of the Mind,” or reader’s theatre.

Theatre of the Mind is a collaboration between the Casper Planetarium and Stage III Community Theatre in Casper. Stage III provides the script, actors and folly artists. The planetarium provides the venue, the visuals and the lighting effects.

Unlike regular theatre, where actors memorize their lines and move about a stage, Theatre of the Mind places the actors behind the planetarium dome. A small light above each actor’s head fades on for each character’s cue, and the actors read their lines from the script. As the actors read their lines, folly artists use a variety of household items to create sound effects. This is how old time radio dramas such as The Shadow and The Inner Sanctum were performed.

Theatre of the Mind began at the Casper Planetarium in 2002 with an adaptation of Ray Bradbury’s The Martian Chronicles. Back then, a simple stage field served as background, a few slides provided basic imagery and manually-controlled cove lights added atmosphere.

As technology advanced, still images were replaced with images and animations projected with CRT projectors. Two colors of cove lights gave way to three color, programmable cove lights, and eventually background settings became fullscale images with masks to avoid hiding the actors.

This year, the Casper Planetarium and Stage III produced their 9th collaborative radio play, The Mission of the Vega. This radio play was written in the 1950s by the Swiss author and playwright Friedrich Dürrenmatt. The Mission of the Vega describes a future where the planet Venus is a penal colony and a third world war is looming. Diplomats from the Free States of Europe and America are dispatched to Venus to enlist the aid of the colonists in a war with the Russians.

The diplomats discover a population that is
not at all interested in joining in a war for land and property. Not even the threat of annihilation can persuade them to return home. Paranoia rears its ugly head and the diplomats return to Earth, convinced that the convicts are secretly planning to strike a treaty with the hated Russians. The outcome is as sobering as it is inevitable; the colony must be destroyed.

The Mission of the Vega was a first for Director Dob Wallace, who teaches German at Trona County High School. It was also a first for his students, who themselves gave a public performance entirely in German. “These kids have never done anything like this,” Wallace said, “most of them have done short, in-class skits, but this is beyond anything they’ve done before.”

Reader’s theatre is not the same scale as a stage drama or musical. To some, the media may seem quaint, or even archaic. Yet reader’s theatre in the planetarium is a unique blend of old and new technologies, one that doesn’t involve thousands of hours of rendering or meticulous soundtrack editing. Reader’s theatre is a simpler form of entertainment, one in which the human voice and story take center stage. For the Casper Planetarium, reader’s theatre is an opportunity to draw in an audience that might not have visited the planetarium otherwise.

Russian Planetarium Association

Nizhny Novgorod. In July, V. Shancev, the governor of Nizhegorodskaya Oblast, greeted the veterans of the aviation industry in the main hall of the planetarium and congratulated them upon the 100th anniversary of Russian aviation, the history of which began with the establishment of a small avian squadron by decree of Nicholas II on 12 August 1912.

Shancev also congratulated everyone with the occasion of the 75 anniversary of the three-day transpolar flight without landing from Moscow to Vancouver on 18-20 June, 1937, which was performed by Chkalov, Baidukov and Belyakov.

In return, on behest of the veterans of aviation industry, V. Rakhmanov, The Hero of Russia, honored test pilot of the Aircraft Plant of Nizhny Novgorod Sokol, presented the governor with the book dedicated to the 80th anniversary of the Aircraft Plant Sokol: “Thirty years of my life are connected with the sky... Over twenty years I tested more than 200 planes and I consider these years to be the best. However in the life of a test pilot there are some tragic events, when your close friends do not return from the flights. Unfortunately, many aces forever will stay in the deserts of Egypt, in the jungles of Korea and Vietnam...”

All the present honored the memory of test pilots who did not return with a minute of silence.

Later, the documentary film Speed was demonstrated to all the guests. This film is dedicated to two people from Nizhny Novgorod, the winners of time and speed, Ace Valeriy Chkalov and Rostislav Alekseev, engineer of hovercrafts. On the dome of the planetarium the film glided the audience over the water’s surface, flying on the coastal shelf with Ekroplan Lun (Dragon), and trembling in the roar of the engines under the clouds with Russian MiGs, fighters of the plant Sokol.

Vladimir. In September, Vladimir Planetarium celebrated its 50th anniversary. All these years the planetarium has been housed in the building of the Orthodox Church and now expects the move to a new building, which has been almost completed.

Colleagues from Kaluga, Kirov, Kostroma, Moscow, Nizhny Novgorod, Samara, St. Petersburg, Yaroslavl, and Kharkiv in Ukraine solemnly congratulated anniversaries. They exchanged impressions and opinions about their work, visited the city of Vladimir and Suzdal, the medieval city of Russia, located nearby. Both cities have been regenerated after destruction committed by the Mongol Khan Batu in 1238.

Novosibirsk. The VII Siberian Astronomical Forum, attended by 520 participants, took place 21-23 September. The opening was held on the site of the new planetarium. It was very symbolic, because the idea to establish the planetarium was born on the first SibAstro event in 2006. Now, to the union of Siberian State Academy of Geodesy and Novosibirsk Instrument-Making Plant is added a new astronomical team, the new planetarium. Novosibirsk, established in 1905, is a leading optical equipment and telescope manufacturer.

Leaders welcomed the deputy mayor of the city of Novosibirsk, A. Titkov, and chair-

RPA: Top: In the hall of Vladimir planetarium. To the right can be seen the P-2 projector made 50 years ago in the workshop of Moscow Planetarium. Photo by Viktoria Stepanova. Left: At Sibastro-2012, the lecture by Professor Palchakov is interesting for both pupils and adults. Below: High flying at Sibastro. Photos by Sergey Maslikov.
man of the board of trustees of the planetarium and member of the city council A. Alexandrov. After the festive opening, all the guests went to the camp Chkalovets, located 100 km south of Novosibirsk.

Despite the fact that the weather was not conducive to astronomical observations, representatives of many cities of Russia arrived: from Moscow, Omsk, Taganrog, Kemerovo, Tomsk, Irkutsk, Tyumen, Novokuznetsk, Barnaul, Biysk, etc. Besides scientists and amateur astronomers, school students from Novosibirsk, Omsk and Novosibirsk region took part in the forum actively.

Educational institutions have become participants of an “astromarathon” in which children demonstrate their knowledge of the history of astronomy and deep-sky objects. All participants of the astromarathon have become winners in various categories. The absolute winner was the team of Aerospace Lyceum of Novosibirsk. but the main prize was won by the team of the school No. 6 of Berdsk. The main prize was the telescope TAL-75R, a gift by Novosibirsk Instrument-Making Plant.

All the participants were able to make a flight on a tethered hot air balloon, to visit a mobile planetarium, and to survey the neighborhood with night vision devices and thermal imagers. Interesting lectures were given by well-known scientists S.Popov (Moscow), S.Yazev (Irkutsk), and E.Palchikov V.Blinov (Novosibirsk), and astrophotographer L.Chekalin (Taganrog).

At the close of SibAstro-2012, the most active participants were recognized: in the category “the big telescope,” Alexander Dimov was named; in the nomination “the most active group Sibastro,” participants from the city of Omsk; in the category “the youngest family,” three couples, students and graduates of the Siberian Academy, who got acquainted with each other a year ago during “Sibastro-2011.”

Finally, welcome to the new RPA website at www.apr.planetariums.ru.

Society of the German-Speaking Planetariums

The next annual meeting of the GDP will be held in Klagenfurt, Austria, from Saturday 4 May to Monday 6 May 2013. Details on the conference will be furnished in the next issue of The Planeterian.

The SEPA business meeting was held during the IPS regional breakout sessions with 33 members in attendance. Plans for the 2013 SEPA conference were discussed. The conference will be held 25-29 June at the Bryan-Gooding Planetarium at the Museum of Science and History in Jacksonville, Florida. Details will be furnished in the next issue of The Planeterian.

A new slate of officers was elected and will assume office January 1, 2013: President Elect Ken Brandt, Secretary/Treasurer Patsy Wilson, and IPS Council Representative John Hare.

Continuing officers include David Dundee, who will move from president elect to president and April Whitt, who will move from president to past president.

Further information regarding SEPA is available at sepadomes.org.

News from Dnepropetrovsk Planetarium, Ukraine

Submitted by Nataliya Kovalenko

Dnepropetrovsk Planetarium and astronomy amateur club AstroDnepr organized observations of the Venus transit on 6 June 2012.

Activities began the day before with telescopic observations of Saturn, globular clusters, and double stars. Under the planetarium dome two talks were delivered, about the history of Venus transit observations, by Dnepropetrovsk Planetarium lecturer Ludmila Marchenko, and about the orbital peculiarities of Venus transits by Oleg Shilov, honorary member of AstroDnepr club.

Observations of first contact were observed via live transmission from Hawaii, under the dome of the planetarium. Later, attendees went out to observe the sunrise and Venus in transit at the Dniper quay. Inhabitants of Dnepropetrovsk joined. Four telescopes were used: one telescope was used for photography, one for demonstration on the screen, and two others were equipped with light filters.

Just two periods of time, in total up to 15 minutes, were favorable for observations because of the cloudy weather. In total, up to 70 people came to observe the transit, including AstroDnepr club members and the general public.

The fourth open meeting of amateur astronomers took place in Krasnograd, 14-15 July 2012. The meeting was dedicated to occultations, especially because of the occultation of Jupiter by the moon on 15 July. The meeting gathered about 60 persons from Kharkiv, Poltava, Dnepropetrovsk, and Kiev, who brought with them 12 telescopes.

The weather was favorable for observations of the sun, and during the evening lectures were delivered on occultations.

Nighttime observing followed (Saturn, deep space objects in the night), and finished early in the morning with the occultation. Morning sessions included an archeoastronomy presentation about total solar eclipses in the Abazins tales (The Caucasus region).

The third event in which the AstroDnepr (Continues on Page 67)
IPS 2012:

What an awesome conference was IPS-Baton Rouge. Thank you Jon Elvert, the staff of the Irene W. Pennington Planetarium and IPS officers for all your work! The conference theme, “Bridge to New Beginnings,” was so perfect too, because the planetarium field has matured beyond the new technologies driving the programming and now we can begin to view these technologies as the tools that they are and begin to use the old and the new lessons and knowledge we have learned to make us the best that we can be!

From my perspective as an educator, I was thrilled with and awed by the invited speakers and the number of sessions devoted to education and live programming. As a cheerleader for portable planetariums, I was really in my element on the vendor floor with all those unique domes!

It was wonderful to network face to face with colleagues from my huge IPS “family” during the conference and on the tours to New Orleans and Houston.

However, this conference was the first to promote significant remote participation with colleagues who could not physically attend through webcasts of sessions from Baton Rouge of the business meeting and other significant sessions. As another first, we were also pleased to include, through a Skype connection, Loris Ramponi as part of a workshop titled “Astronomical Experiences with Real and Virtual Travels.”

Loris was in Italy while Simonetta Ercoli, Michele Wistisen, Joseph E. Ciotti and I were in Baton Rouge and we were able to demonstrate how, through real and virtual travel, experiences can be enriched. The entire workshop and activities discussed will be in the 2012 Conference Proceedings. I really look forward to reading the proceedings to refresh my memory and learn about the papers, workshops and panels I missed.

Live Interactive Programming

The second LIPS Conference took place August 7-9, 2012 at the University of Notre Dame in Indiana. A good summary of this and last year’s conferences and other interesting documents can be found at lipsymposium.org. LIPS 2013 will be held at Seminole State College in Sanford, Florida, hosted by Derek Demeter and Michael McConville. The dates will be announced.

Quoteable quotes from LIPS 2012:

Mark Webb, “Imagination can be as powerful as visuals during a show.”

John Kaufmann: “It’s not canned vs. live, but rather there is a scale between the two extremes.”

“LiveFest”

It has become common that at conclusion of an IPS Conference that a “DomeFest” be held. This is an occasion strictly for presentation of pre-recorded digital dome shows or experts and Domie Awards are given for the most creative of the presentations. This is a wonderful event and a good way to expand imaginations about what digital projectors can provide.

And some of us want more.

At IPS and other conferences many colleagues have expressed disappointment that there are not enough sessions for people who are interested in “live” planetarium programs using both analog and digital projection systems. IPS 2012 was exceptional in that there were several sessions dedicated to addressing this need. People enjoyed theses sessions so much that the idea of having a “LiveFest” attached to conferences emerged as a way to provide even more experienc-
During IPS, Loris Ramponi was in Italy and, through Skype, demonstrates simple objects that can be used during a lesson with young children. At the beginning of the lesson materials are presented in a fun way using the web cam through Skype. Each material becomes a “character,” like the puppets in a puppet theatre. The children are asked to name each item. In this case, students will then be asked to arrange some buttons to match one of the constellation patterns shown on an astronomical map. At right, when given a picture of a celestial object, each student describes his hypothesis about what the picture represents. The Skype operator describes the celestial object through a short talk (confirming the hypothesis and expanding on it or enlightening the student). Photos provided by Loris Ramponi.

During these events, and they are more likely to attend because they like to follow a public initiative where the experience in the classroom will be described. In this case, the public can listen to the sound (student voices) and see and exhibition of photos, instruments or drawings devoted to the contents of the workshop.

“We also can organize similar experiences in schools of different countries and share these audio files between students that learn a foreign language.

“We also include these audio files on our web pages. Students and parents are invited to visit our web pages and to listen to or copy the file.” Go to www.astrofilibresciani.it/Attivita/Bambini_raccontano.htm.

took part was the celebration of the Dnepropetrovsk City Day on August. It was one of the usual collaborations by the astroclub and the planetarium. The planetarium conducted plays about the sun and its planets, made portraits of extraterrestrials, had games with plasticine, exhibited stands about the solar system and the stellar sky.

The AstroDnepr club conducted telescopic observations of the sun. Pictures of the sun from the previous day were provided so the audience could compare the distribution of sunspots they saw with those from the day before and see for themselves that the sun is rotating.

About 300 visitors looked at the sun through three telescopes. In total, about 2,000 attended the exhibition presented by the Dnepropetrovsk Planetarium.
**The History of Radio Astronomy and the National Radio Astronomy Observatory: Evolution Toward Big Science**


Reviewed by Elizabeth Wasilek, Berkeley County Planetarium, Hedgesville, West Virginia, USA

When April Whitt contacted me and asked me about reviewing this book, I was skeptical at first. Although I had heard of the book and wanted to read it, I felt conflicted, as I had met the author, Ben Malphrus, on my very first trip to the National Radio Astronomy Observatory (NRAO) in Green Bank, West Virginia, back in 1988. When I mentioned this to April, she said it wasn’t a conflict of interest, so here are my thoughts on it.

This book is an intriguing look at the formation of the NRAO, along with the development of radio astronomy itself. This well-researched volume describes the personalities and characteristics of the individual telescopes that are now part of the three NRAO sites: Green Bank, West Virginia; Socorro, New Mexico; and Charlottesville, Virginia.

1988 was a unique time at Green Bank. Many of the original staff from the 1950s were still there, and they had wonderful stories to tell of the early days at the observatory. The author captures these stories of the building and operating of telescopes through personal interviews. Photographs, many by the author, provide excellent visual support to the text.

Good descriptions of the discoveries made by NRAO include pictures and diagrams. Explanations of the science and engineering involved in those discoveries convey the difficulty in detecting objects in radio wavelengths. An extensive glossary helps readers with the science, radio astronomy and engineering terms.

The History of Radio Astronomy would make an excellent textbook for a short course for college students or elder hostel participants, or people who may want a bit more from a visit to any of the NRAO observatories.

My only complaint is that the book ends in 1996 (its publishing date) and barely mentions the ground-breaking Robert C. Byrd Green Bank Radio Telescope. The Atacama Large Millimeter Array (ALMA), due for completion of its first phase by the end of 2012, is missing as well, of course. Finishing this book made me crave a second edition with these two telescopes included.

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**The Construction of the Heavens: William Herschel’s Cosmology**


Reviewed by Robin Byrne, Northeast State Community College, Blountville, Tennessee, USA

If you are like me, when you think of William Herschel, you think of a purely observational astronomer. However, after reading The Construction of the Heavens by Michael Hoskins, I have discovered that there was much more to Herschel than I originally thought.

The book itself is divided into two parts. The first section provides a brief biography of Herschel, but primarily focuses on his astronomical research. The second half of the book is a sampling of papers Herschel wrote from 1783-1814. From the biography, you get a glimpse of Herschel’s observational side, with mentions of his discovery of Uranus, large telescopes, and catalogues of celestial wonders found in the night sky. This is the side of Herschel that most readily comes to mind.

The remainder of the book exposed me to new insights regarding Herschel. His interest in cataloging deep sky objects went beyond purely amassing a collection of discoveries. Herschel was trying to understand the nature of the universe. His quest for ever larger telescopes was more than “aperture fever.” He was hoping to resolve these objects with greater clarity in order to better understand what he was observing.

He reasoned, at first, that all nebulae would resolve into collections of stars, if only he could see them in more detail. However, he later decided that some nebulae were composed of some substance other than stars, although he could not understand what would make them glow. This discovery led Herschel to conclude that the objects he catalogued, from nebulae to star clusters, were representing various stages in the development and life of stars. Surprisingly close to the truth, in some cases.

While the book covers a very interesting subject, I was slightly disappointed by Hoskins’ writing style. In particular, when summarizing Herschel’s writings, Hoskins chose to use Herschel’s original terminology, rather than more current wording.

As an example, when Herschel described his telescopes, he referenced them by their
length, rather than their aperture, as is the modern standard. Rather than including their apertures, Hoskins perpetuated Herschel’s style and primarily included only the length.

In another instance, Herschel explains why stars in a cluster don’t all gravitationally coalesce due to “projectile forces” keeping them in motion. Once again, Hoskins duplicates this strangely archaic terminology, instead of a more accurate description of the stars’ motions.

Reading Herschel’s original papers, on the other hand, was fascinating. Although not reproduced in their entirety (some of the papers were originally over 100 pages in length), each one helps to illuminate Herschel’s thought processes.

It was also interesting to see which ideas required extensive explanations, rather than being considered common knowledge. Something as simple as concluding that stars in a cluster are truly associated with each other in space, rather than being a random alignment of disparate bodies, required an extensive statistical analysis to support the conclusion.

All in all, if you enjoy the historical development of ideas in astronomy and don’t mind slogging through some difficult reading, you will likely appreciate The Construction of the Heavens by Michael Hoskins.

**Exploring the Solar System With Binoculars: A Beginner’s Guide to the Sun, Moon, and Planets**

Stephen James O’Meara, Cambridge University Press, 2010

Reviewed by Warren Hart, Mayborn Planetarium & Space Theater, Central Texas College, Killeen, Texas, USA.

This is James O’Meara’s second “observing with binoculars” book, and it’s another good one.

This book is organized by subject/object into six chapters: (1) The Sun: angel of light; (2) The Moon: the lovely dead; (3) Eclipses: descents into darkness; (4) The Planets: worlds of wonder; (5) Comets: divine elegance; and (6) Meteors: when the heavens weep. There is an added Appendix A: The 100+ brightest objects in the Main Asteroid Belt.

O’Meara points out in the preface, “Of all the things in the universe, Solar System objects were, and still are, the most accessible to anyone beginning in astronomy. All these wonders we can still appreciate today with nothing more than our unaided eyes and a pair of binoculars…binocular observing is half reality, half imagination. I want you to appreciate the wonders that you see, not only with your eyes, but also with your mind and heart…”

I am very impressed with O’Meara’s book and am looking forward to many nights outside with both of his books seeing those “familiar Solar System objects” with new awe, understanding and joy. The next time I am asked what book would I recommend for a beginning astronomy hobbyist, I will add this book to my list.

**Psychology of Space Exploration: Contemporary Research in Historical Perspective**


Reviewed by Francine Jackson, University of Rhode Island Planetarium, Providence, Rhode Island, USA.

I was really hoping this book would be more of an expose of how astronauts have coped in space, but instead learned it was mainly a primer on how to avoid problems. However, I recently was fortunate to hear a talk by an actual psychologist who told us that they have the power to ground astronauts, making this book a little more relevant than at first glance.

The space environment is very unusual and quite challenging. Apparently, astronauts can and do have a lot to consider. From the first rides above the Earth, the psychological health of astronauts has been taken into account, as they have to keep good interpersonal relationships with their fellow travelers, often people of differing cultures, countries, and training. All must be able to adapt to everyone they are pushed in to live with in relatively cramped quarters for a significant period of time.

One of the ways to confirm the psychological health of an astronaut is to simulate long-term conditions by placing them in unique Earth environments for long periods of time. Antarctica, the middle of the desert, under water. This differing communal experiment often shows the temperament of these potential travelers, hopefully to the good of the group.

So far, both American and Russian space programs have shown that astronauts of different national and ethnic groups can live and work together for modest periods of time. But what about a full-fledged voyage, such as a multi-year trek to, for example, Mars? Is this a viable possibility? Psychologists are still looking into the many problems that a trip of this duration could encounter.

Each of the chapters concern differing potentials: gender composition, which hasn’t been as much of a problem as originally believed; flying with strangers, again not a major problem; behavioral health, which also proved rather negligible.

But one of the most important aspects of any trip taken by any astronaut has been the ability to look out a window and see the Earth. For all space travelers, this has been a grounding experience, and is almost equal to many executives spending time observing aquariums: very soothing.

The book in itself was rather dry and hard to keep an interest in, but, as I stated earlier, because I became aware of the importance of psychologists in preparing people for space, Psychology of Space Exploration did take on new meaning. I may read it again, just as a way to better learn the type of activities being done to assure the health, both physical and mental, of our astronauts. It may change my opinion of it.

**Everyone’s Universe second edition**


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

The first edition of this excellent book was reviewed in the Summer 2011 issue of the Planetarian. I was delighted to receive the second edition in the mail, and even more delighted to receive the large print version (these eyes aren’t getting any younger).

Noreen Grice is an incredible resource in our profession. Her latest book reminds all of us that one in five Americans has a disability, and the World Bank estimates those same numbers are planet-wide.

This second edition of her book lists planetariums, museums and observatories that provide mobility access, low vision and tactile access, specialized environments for visitors with neurological disorders (including autism), assistive technology for nonverbal communicators, and non-hearing access for people who are deaf or hearing impaired.

The book opens with each of those “accesses” spotlighted in venues around the U.S. including interviews with some educators who already serve audiences with disabilities. There are tips and ideas for working with all visitors.

A state-by-state listing of accessible science museums and planetariums in the U.S. follows, then one listing each in Canada and England. The list of resources is excellent and wide-ranging.

(Continues on Page 72)
Waxing New

More dark skies

Namibia's NamibRand Nature Reserve, one of Africa's largest private nature reserves, has expanded its conservation role to include preserving the star-filled nighttime skies that shine above its dunes and mountains. These efforts in night sky conservation have earned the reserve high honors as the International Dark-Sky Association has just announced that NamibRand Nature Reserve is the world's newest International Dark Sky Reserve.

In the core of the new reserve is the Namib Desert Environmental Education Trust (NaDEET) Centre, which runs environmental education programs that teach about the Earth and sky. Astronomy programs do more than explain about the physical universe; they focus on the importance of the night sky in the cultural heritage of Namibians.

Over 1,600 square miles of New Zealand's South Island also have been proclaimed as an International Dark Sky Reserve, making it the largest in the world. The Aoraki Mackenzie International Dark Sky Reserve (IDSR), comprised of the Aoraki/Mt. Cook National Park and the Mackenzie Basin, is the fourth such dark sky reserve in the world.

Thanks for the assist

Fiske Planetarium at the University of Colorado in Boulder wanted to thank the firefighters for their service and hard work during this past fall's tough fire season in the US west. Instead of just words, the planetarium offered free admission to all firefighters and their families. Way to go, Fiske.

Wagner College gets an upgrade

The Wagner College Planetarium, Staten Island, New York, is in the midst of a massive renovation of its 43-year-old facility. The Spitz AP3 is being replaced by a Spitz SciDome HD, and the dome also will get a new sound system and seating.

A grant from the office of New York State Senator Martin J. Golden (R-Brooklyn) is the impetus behind the renovation. There are only three public planetariums in New York City. In addition to Wagner, they are the American Museum of Natural History in Manhattan, and at Columbia University.

A name change in Schenectady

The Schenectady Museum (New York) is transforming to a regional science center, complete with a new name, a new logo, and a new vision statement. Say hello to miSci (my sigh), the Museum of Innovation and Science. “Our new vision is ‘a scientifically literate community sparking innovation’ and our new mission is to ‘celebrate, explore and inspire science and technology, past, present and future,’” according to the press release announcing the change.

The center is partnering with San Francisco-based Exploratorium to bring interactive science and technology exhibits to New York. The first of these exhibits, “Seeing,” opened in October and will run through June 2, 2013.

Founded in 1934, the museum is the only science center in the “tech valley” region offering a multimedia experience for visitors of all ages. It serves school children from northeastern New York, western Massachusetts, and southern Vermont. The Suits-Bueche Planetarium at miSci houses the only GOTO Star Projector in the northeast and is an official NASA Space Place.

Second edition of Everyone’s

Noreen Grice’s Everyone’s Universe: A Guide to Accessible Astronomy Places came out in a second edition in July. April Whit’s review of the new version appears on page 69, but we aren’t the first to give it the stamp of approval; Astronomy magazine beat us to it in its August 2012 issue.

Specific chapters explore how to make the night sky accessible through mobility access, low vision and tactile access, specialized environments for people with neurological disorders (including autism spectrum disorder), assistive technology for nonverbal communication, and non-hearing access.

You can read more about Everyone’s Universe at www.youcandoastronomy.com.

Production close to home

Digitalis has announced that its inflatable dome production is moving from South America to its headquarters in Bremerton, Washington. The company said that moving production of the Digitalis™ Domes, made specifically for use with digital systems, will reduce risk and cost from the international supply chain, among other benefits. At the same prices are being reduced by approximately 25 percent. For more details, go to digitaleducation.com/press-20120604.html.

Defining the astronomical unit

Planetarians all know that the International Astronomy Union works hard to make clear definitions of objects in space. After having dealt with the definition of a planet (and thus demoting Pluto) in 2006, it tackled another one we use frequently: what exactly is an astronomical unit?

At the IAU meeting in August this year in Beijing, China, members unanimously voted to define the AU as exactly 149,597,870,700 meters. In miles, that’s exactly 92,955,806 miles and 1728 yards. The official notation is au. Previously, it could be AU, au, or ua.

The reasoning behind the exactitude, apparently, is it’s easier to use a definitive figure than to explain it is “the length of the semi-major axis of the Earth’s orbit around the sun,” or, even worse in the 1976 revised definition, that it is “the length for which the Gaussian gravitational constant takes the value 0.01720209895 when the units of measurement are the astronomical units of length, mass, and time.” Because, of course, the sun loses mass and having a variable in the equation was quite the problem.

We’ll take a vote: how many of us will continue to say “approximately 150 thousand kilometers” or “approximately 93 million miles,” and explain it as “the average distance between the Earth and sun?”
While hunting for fossils, The Zula Patrol discovers that the villainous Deliria Delight has been illegally dumping her company’s toxic trash in Earth’s prehistoric past. The Zula Patrol must find and catch her, before her actions ruin the planet. In the process, our heroes learn all about the formation and development of Earth, and the life forms who call it home. 24 minutes.

The Zula Patrol is on a scientific expedition using their loyal pet Gorga’s ability to collect and bottle all kinds of weather. When nefarious villain Dark Truder tricks Gorga into stealing the weather from Earth and other planets, The Zula Patrol goes after him, learning all about weather - both terrestrial and interplanetary. 24 minutes.
George David Millard, 1961–2012

Our community lost a brilliant and kind man with the passing of George David Millard, 51, this fall. David passed away on September 8, 2012 after a lengthy battle with colon cancer. He is survived by his wife Cheiko, and his daughters Kyoka, and Mika.

David began his planetarium career as a show operator and technician at the Science Museum of Minnesota in St. Paul in the early 1980s. Because of his unique technical skills, he was hired by Spitz Inc., in Chadds Ford, Pennsylvania, as the on-site technician for the science museum. He later moved to Chadds Ford in 1984, when he became a key member of the development team for the Spitz Space Voyager Planetarium. David left Spitz after a few years to work in diverse companies like Sonics, Visual Circuits, and Sky-Skan.

David returned to Spitz in 2003 as director of Digital Products. He led the technical development of all Spitz’ products, including the SciDome planetarium. Under Dave’s leadership, Spitz advanced its digital display capabilities immensely, and forged key relationships with software and technology partners. Dave was responsible for dozens of technical innovations at Spitz, including automation control of Starry Night software, two-projector auto-calibration, and the infrared laser control pointer used in SciDome systems today. He was a passionate advocate of education, and strove to make Spitz products valuable for teaching planetariums whenever possible.

Dave was a kind, patient person who laughed easily, worked tirelessly, and cared deeply about friends, family and coworkers. We’ll miss him dearly.

-Contributed by Scott Huggins

Linton Pitluga, 1943–2012

Linton Pitluga began his career in the planetarium field after attending the 1967 six-week summer institute for Teaching Astronomy in the Planetarium, a course developed by his late father, Dr. George Pitluga, who himself was a noted planetarian and astronomy educator. It was held at the State University of New York, Oswego and was funded by the National Science Foundation (a couple more institutes were offered in subsequent years).

Linton and his future wife, Phyllis (who also attended this summer institute) created—with Andy Oliver—the Southern Cayuga Atmospherium-Planetarium near Ithaca, New York. Together they developed a day-long program presenting various concepts in the planetarium (day-night, moon phases, seasons, etc.) followed by experimentation in a laboratory, where pairs of students manipulated 3-D models to recreate what they had observed in the planetarium.

Later, the group would view an inspirational show about significant discoveries in the universe. The teachers selected books and audio-visual materials to use back in the classroom for follow-up. The ground-breaking “atmospherium” used day-time all-sky images to teach weather patterns and concepts. A sky newsletter was produced each month.

Linton and Phyllis moved on to the two planetariums in Cecil County, Maryland. There, they developed materials used while travelling with the students on the school bus, coming and going, for motivation and follow-up. In Suffern, New York, similar materials were developed to enhance the sky show experience.

Later, Linton developed the Gene Cernan Planetarium at Triton College, Illinois, using equipment for all-sky motion pictures to accompany the planetarium star projector. Again, supplementary materials were a part of the enhanced experience.

Linton and Phyllis retired eight years ago in Chicago, and moved to San Miguel de Allende, Mexico, where they jointly presented telescope observing opportunities at the local botanic garden outside of town. Soon after the Venus transit-observing event on June 5, Linton became ill. He was identified with stage-4 cancer and died in Houston at the MD Anderson Cancer Clinic on August 17, 2012.

-Contributed by Phyllis Pitluga and Ian McLennan

The Year in Space 2013


Reviewed by April Whitt.

While this isn’t a book or software, I’m squeezing this review in here at the end (of the column, year, or world—take your pick). I wish Fernbank Science Center had a gift shop, just so we could offer this calendar.

It’s big: 41 x 56 cm (16 x 22 inches), it’s colorful, it’s full of information, with a different topic each month. Described as “fact-filled and lavishly illustrated,” it is also “educationally appropriate for ages 10 to adult.”

Each month is packed with daily moon phases, sky events and space history. Color photographs throughout make this different from a one-picture per month calendar.

Among the monthly fun facts are biographies of prominent people associated with each topic. I was pleased to see that seven of them are women. While I wish it was commonplace to see women’s contributions highlighted, I’m delighted with these. I’d highly recommend this publication.

1 See www.indiebookawards.com; Noreen’s book was a finalist in the SCIENCE/NATURE/ENVIRONMENT category. The Next Generation Indie Book Awards is the largest Not-for-Profit book awards program for independent authors and independent publishers.
NARRATED BY LIAM NEESON

DY N AMIC

E A R T H

Exploring Earth's Climate Engine

Thomas Lucas Productions
2013
13-14 April. Italian Association of Planetaria (PlanIt), XXVIII National Conference, Cagliari Planetarium, Italy, and 3rd Full-Dome Italian Festival. During the conference Skype session for planetarians from other countries. www.planetariitaliani.it. Contact: osservatorio@serafinozani.it
May. Canadian Association of Science Centres, 11th Annual Conference. http://www.canadiansciencecentres.ca/main.html; Contact: ian@ianmclennan.com
3rd-5th May. IFF'13, Immersive Film Festival, Third edition, Centro Multimeios, Espinho, Portugal. Organization Navegar Foundation. iff.multimeios.pt
4-6 May. GDP 2013, Annual meeting of German speaking planetaria, Planetarium Klagenfurt, Austria. www.gdp-planetarium.org www.planetarium-klagenfurt.at
6-8 June. “Dreams, the spirit of innovation”, ECSITE Annual Conference (European Network of Science Centres and Museums), www.ebsite.net
24-28 June. 8th World Conference of Science Journalist (WCSJ), Helsinki, Finland. www.wcsj2013.org
17-20 July. Middle Atlantic Planetarium Society (MAPS), Annual Conference. Ausherman Planetarium, Earth and Space Science Laboratory, Frederick County Public Schools in Frederick, Maryland, USA. www.mapsplanetarium.org
20-24 July. Annual meeting of the Astronomical Society of the Pacific (ASP), San Jose, California, USA. Contact: Andrew Fraknoi, fraknoiandrew@fhda.edu; www.astrosociety.org
9-10 August. International Planetarium Society Council Meeting, Bolzano, Italy.
31 August. Deadline for the applicants of “An experience in Italy for a French Speaking Planetarium Operator”, in collaboration with APLF. www.astrofilibresciani.it/Planetarii/Week_in_Italy/Week_Italy.htm
September. British Association of Planetaria (BAP), 2013 annual meeting. Contact: Dr Jenny Shipway, president@planetaria.org.uk
6-8 September. Nordic Planetarium Association Biennial Conference, AHHAA Science Center, Tartu, Estonia. Conference language English. Contact: Margus Aru, margus.aru@ahha.ee
15 September. Deadline for the applicants of “A Week in Italy for an American Planetarium Operator”, in collaboration with IPS Portable Planetarium Committee. www.astrofilibresciani.it/Planetarii/Week_in_Italy/Week_Italy.htm

2014
17-19 March. 7th Science Center World Summit, Technopolis, Mechelen and Brussels, Belgium. Partners: Technopolis, Flemish science center, Mechelen, Royal Belgian Institute of Natural Sciences, Brussels. www.techopolis.be
31 March. Deadline for application for scholarship funds (IPS support Beijing Conference attendance by individuals). www.ips-planetarium.org
1-5 May. Three languages · The same sky, Symposium of Planetariums 2014 Lucerne, Switzerland (in planning).
June. International Planetarium Society Council Meeting, Beijing, China.
23-27 June. 22nd International Planetarium Society Conference, Beijing Planetarium, China. www.ips2014.org, contact mail Dr. Zhu Jin, jinzhu@bjp.org.cn

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 are included in the International News column and elsewhere in the Planetarian.

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
In last issue’s column, there was mention of the popular American television series *Big Bang Theory*. Several alert readers responded, and I located some information from the Cheap Thoughts web site at www.angelo.edu/faculty/kboudrea/cheap/cheap4_physics.htm#Other.

In the ongoing search for better names for the Big Bang, we have:

- The Bottom Turtle
- “That Point In Time When the Volume of the Universe Decreases to Approximately Zero, and Density Approaches Infinity, and the Combination of the Strong Nuclear Force and Electromagnetic Attraction Between Red and Blue Colored Quar — hey Steve, can’t we think up a nickname for this??”
- The Best Of Times, The First Of Times
- The Grand Opening Sale
- *Pop* Goes Existence!
- The Time, Space & Energy Factory Outlet Sale
- Dude, Where’s My Void?
- The Horrendous Space Kabloooey (from the comic strip Calvin & Hobbes)
- The Colossal Kaboom
- My Parents Went to PanDimensional In-
- ternexusCon, and All I Got Was This Lousy Universe
- Honey, I Blew Up the Cosmic Egg
- “Oops!”
- Universes ‘R Us
- What the heck was THAT!!!?
- Ready or not, here I come
- Bursting Star Sack
- Hey, Looky There at That
- Jiffy Pop
- Let There Be Stuff
- OK, Fine
- Stupendous Space Spawning
- The Primal Billowing
- The Whole Enchilada
- A Steven Spielberg-George Lucas Production
- Well, I’ll Be

**It’s all about the ice cream**

At the Great Lakes Planetarium Association’s annual meeting in October, Stephane Coutu, currently a faculty member in physics, astronomy and astrophysics at Penn State University, shared “Particle Astrophysics at 100: A Century of Adventures and Discovery” from the earliest hot air balloons carrying cosmic-ray detectors to the complex instruments that fly on huge helium filled balloons today.

One of his instruments measures Cosmic Ray Energetics and Mass and carries the acronym CREAM. After successful launches and recoveries, CREAM is being readied to travel to the International Space Station (ISS) about a SpaceEx flight. That makes it ISS-CREAM, right? Sweet.

One of the many clever touches to the GLPA conference was a series of cards on our supper tables at North Hills High School. Hosts Sue and Buck Batson asked teachers in their district to share a writing activity with their students. Cards were printed with an astronomical image on one side and a “prompt” on the other: “My favorite planet is ______,” “My favorite constellation is_____________,” “Astronomy is ______ because__________. The results served as table decorations. Among my favorites:

“At night when I look at the stars I think I see a shooting star. I make a wish but will it come true? It did because I got ice cream and stew.”

“My favorite constellation is Leo the lion because it is one of the earliest recognized constellations. As of 2002 the Sun appeared in Leo. I think it is so interesting how the sun is not considered a sign of Leo. In the constellation, Leo is walking.”

“I like thinking about space because you can see new things (planet, stars). There are so many rocks.”

Dr. Cherilynn Morrow (left) celebrated the June transit of Venus with Dr. Lou Mayo’s daughters atop Mauna Kea in Hawai’i. Hooray for astronomy! And hooray for the technology and people to share it with the world! Photo by Ron Beard
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More sites still to come in 2012

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