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Contact the Treasurer/Membership Chair for individual member address changes and general circulation and billing questions.
Note to self: never schedule a new program to open at my planetarium at the same time as Planetarian deadline.

That lesson learned, I’ll move on to some of the highlights in this rather pudgy issue.

In addition to IPS matters, including the preview of IPS2014 in Beijing, China that starts on page 12 and the ambitious plans that the new Science and Data Visualization Task Force have in mind, we have two educational research papers and two historical items.

And, just in time for the holiday season, we have an uplifting family tale of monsters and murders.

Pierre Chastenay from Rio Tinto Alcan Planetarium in Montréal shares the results of his method of teaching moon phases to middle-school students. We have to give him kudos for being tenacious in his research. Because his dome was projectorless, he brought a portable to work with the students, leading to a “dome within a dome” situation.

Congratulations also must go to Pierre, who used the research as part of his doctoral dissertation and has accepted a professorship in Science Education at the Université du Québec à Montréal. He promises to continue sharing his research with us.

The “fantastic four” from Moorehead Planetarium and Science Center at the University of North Carolina shares their research into interactions in live public planetarium presentations. Michael Neese, Amy Sayle, Portia Nielya, and Todd Boyette tackled an extremely difficult aspect of planetarium education to research and came up with a way to measure outcomes.

The lives of the people behind two of our field’s oldest star projectors, Armand Spitz and Walter Bauersfeld, are featured in this issue’s history pieces.

Verne Spitz Rice returned to her roots in southeast Pennsylvania to visit the company that her father founded and speak at MAPS and Spitz’s Summer Institute.

She described looking forward to the visit as a lark. I describe her stories about her father as a real hoot. Read it, starting on page 34, for yourself and don’t worry about laughing out loud.

Peters Volz’s research into the life of Rudolf Straubel is in a different league. It is a meticulously-researched scholarly piece on the early history of the Zeiss company and the major players at the time that the concept of the projection planetarium was born.

It is long enough to require two parts, the first starting on page 51 and the second appearing in the March 2014 issue.

I was hesitant to accept such a long article, but agreed to add to the body of research into this essential part of planetarium history.

The article underwent several revisions at my request to neutrally present the difficult history of doing business before and during World War II in Germany, especially with Jewish employees and those with Jewish ties.

One of our favorite stories from the stars is recounted by Jean Creighton from the University of Wisconsin-Milwaukee Planetarium. Jean has a special place in her heart for Greek mythology, and tells us the twisted tale of Medusa and her equally twisted family.

Another “must read” is the transcript of Ivan Dryer’s keynote address at the IMERSA Summit this year, which starts on page 62. I enjoyed it immensely two times: hearing it in person and reading it 10 months later. ☆
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Dear Fellow Planetarians:

How quickly does yet another year pass by—but what a great finale we have this time—with comet ISON performing “live on stage” right in front of us! The drama of a comet passing so close to the sun is just the right stuff for us to engage the minds of people, giving us all opportunities to combine both space-based and ground-based observations with our unique abilities to simulate ISON’s route across our sky and through the solar system and link all this to concepts of celestial mechanics and astrophysics, from the origin of our solar system to water and the story of us being starborn!

Along with Venus, Jupiter and Mars, we even have some more “testimonials” hanging around to build our case. Hence, how bright or weak the comet will be after perihelion is not really the issue here, because this celestial event creates enough momentum for all of us to showcase “why we need a planetarium.”

Allow me now to report on some items which have great potential for the future of our beloved planetariums.

From roots to fruits of the future

In August this year, IPS Council met in the Alpine Region of Europe. Munich’s international airport served as gateway for this off-year council meeting, giving delegates the chance to get together a few days earlier and receive a warm welcome on Munich’s “Museum Island” by Wolfgang Heckl, the charismatic director general of Deutsches Museum.

Ulrich Kernbach, head of exhibition, guided our special tour of this unique museum, which is world’s first science and technology museum and is currently gearing up for a major expansion phase.

This phase will culminate in 2025, the museum’s centennial, which will also be the centennial of our planetarium profession, since the projection planetarium was invented by Zeiss for this museum and the first-ever planetarium (after some tests in Munich and Jena beginning in 1923) as part of the opening of Deutsches Museum on May 7, 1925.

The date was chosen to coincide with the 70th birthday of Oskar von Miller, founder and driving force for the museum and planetarium idea.

Delegates and guests really enjoyed standing next to the legendary Zeiss Mark I projector, which is still on display there, while, next door, the planetarium theater is being completely modernized and will be reopened by the end of 2013. It will feature a Zeiss-Velvet digital fulldome system. The larger dome at Forum der Technik is also currently closed and will be rejuvenated as part of the 2025 plans of the museum.

Three hours at Deutsches Museum were just enough to see just a few of its masterpieces and to whet the appetite for coming back again soon!

We also agreed to team up with Heckl to use all the archives and expertise available to look into the early years of planetarium history, uncover untold stories, and reveal what happened in these pioneering years. This will be perfect for both our magazine and a possible special publication devoted to our own heritage.

But Bavaria and Munich is not just a region of great history and heritage—it is also an arena for high-tech space sciences of tomorrow. A huge research hub has been established in recent years in Garching, located between downtown Munich and Munich airport.

It features several Max Planck institutes (astrophysics, extraterrestrial physics) and the headquarter of the European Southern Observatory (ESO). Just a few months ago, ESO, the most productive observatory on Earth (head-to-head with the Hubble Space Telescope) celebrated its 50th anniversary.

Lars Lindberg Christensen, ESO’s head of education and public outreach department, International Astronomical Union press officer and IAU Commission 55 president, was the host during our visit at ESO and gave council members an overview about this outstanding astronomy organization, which extends way beyond Europe with its new member Brazil and certainly with Chile, where all ESO telescopes are based.

The completion of Atacama Large Millimeter/submillimeter Array (ALMA) and the upcoming 39-m European Extremely Large Telescope (E-ELT) will have a tremendous impact on our understanding of the universe and on how we present it to our audiences. Since ESO will include a state-of-the art planetarium in its new visitor center, which is currently being built as part of the extensions of the headquarters in Garching, there is consensus that IPS and ESO can benefit from working together much more closely.

After a tour of the construction site, we visited the image lab and production studio and saw what ESO outreach already offers for our educational work: tremendous assets, including 271 high-resolution panoramas, time-lapse scenes and gigapixel sky surveys. All material is available online at www.eso.org and visuals can be used freely. All text usually is available in 21 languages.

To develop further and harvest these fruits of the future, a memo of understanding between IPS and ESO is in preparation. I like to thank Lars and his dedicated team for this great opportunity and the wonderful hospitality. I will keep you informed about next steps and joint possibilities.

Next came South Tyrol

Continuing from Garching, a three-hour bus ride through southern Bavaria brought Council into the beautiful Alpine mountain scenery and across Austria to our hotel in Bolzano in South Tyrol (Northern Italy).

The same evening, we had arranged for a really cool surprise for council at the South Tyrolian Museum of Archaeology: museum director Andrea Fleckinger gave us a special after-hours tour and introduced the worlds oldest mummy, famous Iceman Oetzi (the British dubbed him “Frozen Fritz”). This set the stage for our quest to link the story of us—past human history and the evolution of the environment and the cosmos we live in.

South Tyrol can indeed be regarded as a crossroad of human, geological, and cosmic histories. And being bilingual—German and Italian (plus English, which is also used practically in all public intuitions)—this beautiful region in Europe can serve as a wonderful example for intercultural collaboration and development.

I am sure that Council members also witnessed that during our meeting, which was held next to the brand new Planetarium South Tyrol. This 8-m, high-resolution digital 3D planetarium is directly attached to the school, kindergarten, and community complex in the village of Gummer (part of the community of Karneid) and works jointly with the Max Valier Public Observatory.

At the Council meeting

The Council meeting was truly remarkable, since we not only selected the host for the IPS conference following Beijing, but also announced IPS Vision 2020 as an important step to move our society forward to a health-
ier future. The atmosphere, spirit and decisions achieved by Council were truly outstanding and I like to thank all Council members and my fellow officers, with IPS Secretary Lee Ann Hennig in particular, for the dedicated work which will benefit all of us in the future!

I also want to thank our dear friend Shoicze Itoh, who I sometimes call “Mr. Planetarium of Japan,” for joining Council to present to us the opportunities offered to planetariums by the National Astronomical Observatory of Japan.

NAOJ is a pioneer in developing data sets and software (Mitaka) for visualization of astrophysical phenomena in space and time. I am very pleased that Itoh-san agreed to be on the team of the new IPS Science and Data Visualization Task Force, chaired by Mark SubbaRao, and I expect to see NAOJ’s pioneering work on more domes soon.

For more details about our Council meeting, please have a look at the minutes that start on page 17. But let me just briefly mention two more events arranged during that meeting. On the first evening, Albin Kofler, mayor of the community of Karneid, invited all of us to the breathtaking medieval Castle of Karneid, where all of us had a blast!

Sitting next to the owners, the Duke and Duchess of Karneid, we could reveal that they are indeed relatives of Munich’s Oskar von Miller, the “grandfather” of the first planetarium.

That is why I think that our tour really beautifully connected heritage and future of our field. And we certainly paid attention to the real sky; our last evening coincided with the maximum of the Perseid meteor shower, which traditionally is celebrated in Bolzano/Bozen as Laurentius Nacht, the Night of St. Lawrence.

Many delegates joined the fabulous team of the Max Valier Society and spent a late night for meteor watching at the public observatory with its breathtaking panorama of the Dolomites and a marvelous sky with the Milky Way arching over us.

I am sure that none of us will ever forget these days and nights and the heart-warming people of South Tyrol. Many thanks especially to Mayor Albin Kofler and his enthusiastic team for inviting us and being such gracious hosts to IPS. All transportation to and from Munich and during the meeting, plus the fantastic lunches and dinners, were organized and paid for by Albin Kofler’s community.

IPS has great friends in South Tyrol and we will continue to cooperate. Opportunities for professional training and IPS summer schools at Planetarium South Tyrol are in preparation.

Two conferences in Warsaw

Congratulations to Copernicus Science Centre in Warsaw (Poland), which was selected as host site for our IPS 2016 conference. Their concept of having basically all conference activities within the science center itself and not at an external conference facility seemed to have been particularly attractive to Council members.

However, the two other bidders were both extremely competitive and all of us wish that both Telus World of Science (Vancouver, Canada) and Cité de l’espace (Toulouse, France) will consider to bid again for future IPS conferences. I am confident that we will also see IPS conferences at these sites in the future.

Just a few weeks ago—October 14-18—Copernicus Science Centre hosted the 2013 Communicating Astronomy with the Public (CAP) conference. CAP is organized by IAU Commission 55 and presided by the abovementioned Lars Lindberg Christensen of ESO. It was really great to meet several IPS members and activists at that meeting, among them two past presidents: Martin Ratcliffe and Martin George.

With around 200 participants from around the globe, this was the biggest CAP conference ever. Following the previous meetings in this series, CAP2013 considered challenges in communication of astronomy and space exploration, as well as the influence of these activities on science outreach and education.

Keeping the momentum from IYA

Many discussions developed about how the momentum gained from the extremely successful International Year of Astronomy 2009 can be kept alive and be intensified. The upcoming International Year of Light 2015 (IYL) might give us a new framework for some new initiatives, but our joint IYL-panel discussion at CAP revealed that IYL so far seems to lack a clear central focus or historic moment simple enough to communicate well to everybody like Galileo and 400 years of the telescope. Still, IYL 2015 offers opportunities for all of us and at CAP 2013 we took the first step in the process of joining forces between IAU and IPS in this matter.

The meeting really demonstrated how useful some of the newer formats for presentation are, like “unconference” and workshops sessions as well as interactive planetarium shows. They can lead to more interaction between delegates and contribute to a better conference experience.

IPS 2014 in China: many firsts

Speaking of IPS conferences in the future, our IPS 2014 conference in Beijing is only six months away (June 23-27, 2014). This issue of our magazine includes an update from our host. (See pages 12-14) More detail and the latest updates are available through the IPS website (www.ips-planetarium.org) and the respective links to the conference website. Also, please make sure you check with the Chinese embassy in your country to verify the necessary steps for obtaining visa for your entry into this rapidly-evolving country.

The IPS 2014 conference will be unique in many ways, so you should not miss it! It will be the first ever IPS conference in China and after Osaka, Japan in 2006 only the second IPS conference to ever take place in Asia.

Never before have we had more than one large and permanent dome available for the entire conference to present, not just technologies but examples of best practice in educating and inspiring audiences in planetariums. Great content is the key for success of our planetariums, so we will prepare a specific focus on excellent content at IPS 2014.

New: IPS awards, fulldome festival

The Beijing conference will be the first IPS conference where we present IPS awards for planetarium shows and showcase the winning fulldome productions as part of the conference program.

The winners will be selected from the IPS-
Macao International Fulldome Festival (IPS-MIFF). This festival is open to all IPS members, invited guests and individuals interested in full-dome media. The festival will be held at the impressive Macao Science Center on June 18-21 as one of the 2014 pre-conference events.

The festival will feature films suitable for showing in full-dome in 2D or 3D domemaster format with a maximum resolution of 8k (8192x8192 square pixels), plus a range of related events.

Special attention will be devoted to the educational aspects of the respective productions.

Adjudication will be held on 19-20 June 2014. From 21-29 June, the festival films also will be shown to the general public in Macao.

I am really pleased that the board of Macao Science Center has the vision to host such an international festival in cooperation with IPS. Many thanks to Che-Kuen Yip, who has been essential in moving this forward.

So plan for extra days in China to attend not only this festival in Macao, but also to visit the nearby Hong Kong Space Museum and its awesome astronomy park.

Details, including guidelines and rules for entering your production into the competition, should be already listed on the IPS website by now. Check also your other options for pre- and post-conference tours and make sure that your passport and visa will be appropriate for entry and re-entry into the respective territories on these dates.

**New IPS committee**

A key mission of our organization is to help share experience among our members so that we can better serve our audiences and succeed in our desire to teach and inspire people on Earth about the cosmos.

But IPS, in recent years, did not offer any new planetariums. Despite the fact that in recent years many planetariums were going through the process of renewal or substantial technical upgrades.

As I feel strongly that any planetarium design and technology can only be successful when it is developed along with the staffing and the operations, I asked Ian McLennan, long-term expert in the field, to chair the newly instituted IPS Planetarium Design and Operations Committee.

In addition to the Science and Data Visualization Task Force chaired by Mark SubbaRao, this brand new IPS committee will have the purpose to provide high-level guidelines for 21st century planetarium design and management/operational considerations and address “best practices” based on experience gained from its members as well as relevant outside sources.

This committee will also act as a proactive technical liaison with other parallel organizations, including but not limited to IPS affiliates as well as IMERSA, the Giant Screen Cinema Association, LIPS, the Association of Science-Technology Centers, the Asia Pacific Network of Science and Technology Centers, and the European Network of Science Centres and Museums.

One ongoing task for Ian’s committee will be to update our publication/guideline “So You Want To Build a Planetarium” and keep it up to date on a biennial basis, probably in the form of a web-based “wiki” document. For the upcoming conference in Beijing, we will set up a session on that subject, showing some of the major pitfalls one should avoid when launching new planetariums.

I salute Ian for taking on this important task as chair in a non-biased and vendor-neutral fashion for the benefit of a living and growing planetarium community.

Please check the respective committee web pages if you want to learn more. See also Mark’s article about the first steps of the Science and Data Visualization Task Force on pages 20-22.

As I mentioned in previous messages, I will continue to reshape committees and their tasks so that your membership will hopefully be enriched by access to more expertise and resources. Your active support is essential in that process.

**IPS Vision 2020**

Our profession faces tremendous changes and challenges, it has become obvious that the two-year term of an IPS president is quite short in order to design and implement necessary change.

So I felt it would be best to team up early on with my successor, President-Elect Paul Knappenberger, and work on a joint long-term plan for our organization which we termed IPS Vision 2020.

Every healthy organization plans for its evolution, and 10-year intervals seem to be a realistic time frame for strategic planning. In order to be effective, such a planning process must be inclusive, providing opportunities for input from all of our members, including individuals and institutions.

We want input from all types of planetariums: stand alones, portables, those in natural history museums, science centers, schools, and universities, as well as our vendors and external partners.

In creating our Vision 2020, we must anticipate what will be different in 10 years and answer the question “How can IPS better serve and support its members?” The process of creating Vision 2020 provides a means of engaging our younger members, who have unique perspectives and enthusiasm.

Together we will review and update, where appropriate, and in a coordinated manner the IPS mission, by-laws and procedures; format and effectiveness of Council meetings; conference guidelines and best practices; standing committees; awards; and other aspects of the ways that IPS serves its community of members.

Vision 2020 can provide the opportunity to grow and better support IPS membership in every region around the world. Watch out for an upcoming survey and stay in touch with your representative on council; we want your input in this step-by-step process which we initiated at the council meeting in South Tyrol.

As always, onwards and upwards!☆
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**Guest Editorial**

**The Century of Our Grandchildren**

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Most Fellows of Strömstad Academy see the 21st Century as The Century of Our Grandchildren. We, therefore, feel a special responsibility for the coming 87 years. Jorgen Randers’ book 2052: A Global Forecast for the Next Forty Years is pessimistic regarding the second half of the present century. Maybe Strömstad Academy, with its great academic width, can describe both expected and wanted development and thereby, maybe, affect the development between now and 2100. Professionals in different fields, including planetarians, are encouraged to participate.

**Strömstad Academy, 2013**

As of October 2013, Strömstad Academy consists of 70 fellows, out of which 60 are professors; appointments are unsalaried. The academy was formed five years ago.

Most of us live in Sweden. The scientific competence of the fellows covers almost the whole academic field from humanities to natural science, from medical to social science, from technology to theology.

Academy activities include the website www.stromstadakademi.se, a regular electronic newsletter, publication of the (electronic) series Acta Academiae Stromstadiensis, arranging a yearly Academic Festival in Strömstad, Sweden and other meetings, initiating transdisciplinary project groups—among them Public Understanding of Science (PUS, with Public Understanding of Astronomy-PUA as a sub-group), Learning on the Brain’s Condition, Renewable Energy in Strömstad Academy (RESA), and, most importantly and most recent, The Century of Our Grandchildren.

The Academy is basically virtual, but has offices in Strömstad City Hall. We use Swedish and English and we invite applications to be appointed as fellows from all countries and all disciplines.

Most of us have grandchildren of our own, so while few of today’s fellows will be alive after 2030, many of our grandchildren will experience the coming turn of the century, the year 2100. For us, it is natural to regard the 21st century as the century of our grandchildren.

This is why we feel a common personal responsibility for the development of the world in a perspective that stretches 87 years into the future. It is in the interest of our generation that the world until then develops so our grandchildren and their contemporaries will be able to live a good full life and that the planet then be in such a good shape that future generations also can live lives fit for human beings.

Strömstad Academy, during the days after midsummer 2013, held its fifth Academic Festival, this time in the presence of some 40 fellows and guests. Among the items of the program was an extended session during which we discussed the academy’s strategy for our activities during the coming years, followed by the annual meeting which decided upon an activity plan for the rest of 2013 and 2014.

As a result, The Century of Our Grandchildren will be the theme of a major multidisciplinary project and was chosen as a motto and theme for the academy.

**Randers’ book 2052**

Forecasts of our future are quite abundant and cover time periods between a few years and several centuries or longer. Perhaps the best known and discussed today is the United Nations’ Intergovernmental Panel of Climate Change prognoses, with thousands of scientists from all over the world contributing to the work on a voluntary basis as authors, contributors and reviewers, regarding the future climate and its development based on different scenarios.

The following may be more important than many of the others.

Norwegian Jorgen Randers, now a professor of climate strategy at the BI Norwegian Business School, was a young PhD at the Massachusetts Institute of Technology when he co-authored *The Limits to Growth* in 1972, with Donella and Dennis Meadows and William Behrens III. This book was the first worldwide report by the Club of Rome, itself a global think tank similar to Strömstad Academy.

Now he has returned to long-time forecasting with his book *2052: A Global Forecast for the Next Forty Years*. The book is a follow-up to the 1972 book. He relies on present statistical data and trends from 1970 to 2010 and has reached these main messages of 2052:

1. The global population will reach 8.1 billion just after 2040 and then decline.
2. The global gross domestic product (GDP) will grow but slower than expected, reaching 2.2 times the 2012 level around 2050.
3. The growth rate in global consumption will slow down and global consumption will peak in 2045.
4. Resource and climate problems will not become catastrophic before 2052.
5. The world will be put on a dangerous track towards self-reinforcing global warming in the second half of the century.
6. Social tension and conflict will grow.
7. The short-term focus on capitalism and democracy will ensure that the wise decisions needed for long-term well-being will not be made in time.
8. Population will be increasingly urban and unwilling to protect nature for its own sake.

This Swedish summer 2013 family photo includes 4 grandparents as well as 8 grandchildren born 1997 to 2010, plus—not so obvious—one to be born in 2013 and one in 2014. The author is in the white t-shirt on the right. Photo by Eva and Jonas Häggström.

for scholars involved in research, development, education, and information. The initial thought was that the academy could be a new home institution for emeriti, who constitute 70% of the fellows. Our mean age is 68 years; the oldest is 82 and the youngest is 42; half of us are born in the 1940s.

This Swedish summer 2013 family photo includes 4 grandparents as well as 8 grandchildren born 1997 to 2010, plus—not so obvious—one to be born in 2013 and one in 2014. The author is in the white t-shirt on the right. Photo by Eva and Jonas Häggström.
9. Impact will differ in the five studied regions: the US, OECD (Organization for Economic Co-operation and Development) consisting of 34 industrial nations, less the US), China, BRIDE emerging economies (Brazil, Russia, India, South Africa, Indonesia, Mexico, Vietnam, Turkey, Iran, Thailand, Ukraine, Argentina, Venezuela and Saudi Arabia), and the rest of the world (ROW).

10. The US and OECD will experience stagnant per capita consumptions, China will win, BRIDE will make progress, and ROW will remain poor.

11. The conditions of the world’s five regions will differ dramatically in 2052.

Randers’s forecasts are, to put it mildly, gloomy. Positive changes will come too slowly to prevent disasters during the second half of the century. The only exemption seems to be renewable energy use, which will grow rapidly and become largest in 2040. The data are given in an open access spreadsheet on www.2052.info, where you also can make your own forecasts.

Our question, then, “Is this the development that we want our grandchildren to experience?”

Examples of what fellows may share

In connection with this, Strömstad Academy has a fairly unique position with both great width and great depth. We are scientists within so many scientific disciplines that we together will be able to describe future probable and desirable trends from many different aspects, and much more than demography, economy, and climate.

Here follows some examples regarding what fellows of the academy would be able to treat in the development up to the next turn of century:

- The associate professor in informatics, Data and Communication;
- The research assistant in architecture, Dwelling and Construction;
- The professor of organic chemistry, Environmentally Harmful Chemicals;
- The professor of clinical microbiology, Viruses and Epidemics;
- The professor of physics, Public Understanding of Science vs. Religious Conceptions;
- The assistant professor in energy efficient technologies; Energy Use;
- The research assistant in economics, Capitalism;
- The assistant professor in German comparative literature, Books and Electronic Media;
- The professor of German, Large and Small Language Locales;
- The assistant professor in pedagogics, The School;
- The research assistant in science of education, Learning;
- The professor of ethnology, Cross-Border Collaboration between People;
- The professor of French, Language Development;
- The professor of museum science, Cultural Heritage;
- The professor specializing in science centers, Informal Learning;
- The professor specializing in elderly people, Life Quality at the Age of 100 Years;
- The professor of energy economics, Physical Planning on Energy Smart Buildings;
- The associate professor in renewable energy, Vehicular Traffic without Fossil Fuels;
- The associate professor in special education, School for Underprivileged Children;
- The professor of science of education, The Changing Learning;
- The professor of ethics and value research, Human Driving Forces;
- The research associate in pedagogics, Higher Education;
- The associate professor in tourism studies, Culture Clashes;
- The associate professor in human geography, Traffic and Travelling;
- The assistant professor in applied climatology, Climate;
- The associate professor in pharmacology, Medication and Dementia;
- The research associate in solar energy technology, Renewable Energy Production;
- The professor of psychiatry, The View of Psychiatric Diseases; and
- The assistant professor in psychology, The View of Body and Soul.

Doesn’t this sound exciting?

This should, of course, be regarded as examples of what academy fellows engaged in the project The Century of Our Grandchildren may treat. Many of the fellows, maybe most, may find another focus, and some will drop away.

Scholars who are not yet part of Strömstad Academy may want to participate and the number of different treated future trends will grow.

According to the preliminary sequence of events, a number of texts will be written step by step, first as synopses, then as preliminary texts, maybe in DELPHI fashion, which permits participants to read and be inspired by the others’ texts.

At a suitable moment, perhaps in the fall of 2014, participants in the project will have the opportunity to present their thoughts and reflections at a joint several-day conference, to which others will be invited. The contributions then will be compiled in a publication.

(Notes: The DELPHI method is a structured communication technique, originally developed as a systematic, interactive forecasting method which relies on a panel of experts. Source: Wikipedia)

As an example of topics for other professionals, planetarians might want to write on the future trends on:
- our knowledge of the Universe,
- space travel,
- extraterrestrial civilizations, or
- education in planetariums, and thereby take part in the project The Century of Our Grandchildren.

Afterword

Which forecast, which future trend, are participants supposed to write? A forecast that is as realistic as possible; a projection based on the situation today and the development during the last decades, as well as the author’s assumptions about the development in general.

Another forecast could be a more desirable development and which presumptions then would be required, both in short and long terms.

Both will contain a progress report from the year 2100 as a takeoff for the planet’s and mankind’s continued development. I have a feeling that our jointly compiled description of the future has a chance to affect our age and to redirect the development in a way that can make the century of our grandchildren a good century.

References


IPS2014

Educating for the Future

Jin Zhu, Director
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Beijing, China
jinzhu@bjp.org.cn

Beijing Planetarium is honored to invite all members of the International Planetarium Society (IPS) to participate in the 22nd IPS Conference, to be held from Monday to Friday, June 23-27, 2014 in Beijing, China.

We would like to give you an update and convince you that this will be the event you and all your colleagues should not miss. All the preparations are well underway to welcome you in Beijing.

Beijing, capital of the People’s Republic of China, is the nation’s political, economic, cultural, educational, international trade, and communication center. Located in northern China, the city also serves as the country’s most important transportation hub and port of entry.

Both a tribute to China’s proud history and a gateway to China’s future, it is an international metropolis, home to more than 20 million people from all walks of life. Having succeeded in hosting the 2008 Olympic Games, Beijing is ready and looks forward to welcoming and impressing you in the months ahead.

The IPS 2014 Conference, under the theme of “Educating for the Future,” will focus on the significant role of planetariums in future astronomy education. It will showcase the latest advancements in astronomy, planetarium theater management, and technology, while providing an ideal forum for the exchange of ideas on astronomy education and visitor experience.

Hundreds of planetarium professionals around the world will be brought together to exchange ideas on best practices and present new technology. Chinese educational officials and professionals will also be invited to this fantastic gathering devoted to planetarium development and astronomy education.

Host facilities

Located in the northwest of Beijing, Beijing Planetarium is the first large-scale planetarium in China. It will be the main venue for all keynote, poster and parallel sessions, as well as exhibitions and vendor demonstrations.

There will be two areas for exhibitions, both equipped with a high-speed fiber optic network. Area I (1200 square meters by 7 meters in height) is now under construction and will be suitable for various types of exhibits. Area II (400 square meters by 4 meters high), in Building A of Beijing Planetarium, will be available with 3-m by 3-m booths. A team of professional technicians will be ready to render any service that may be needed to facilitate setting-up and dismantling.

Beijing Planetarium includes two dome theaters, a 4D theater, and three classrooms. The ultimate dome theater, Cosmos theater, with 400 seats, can comfortably admit all members for keynote speeches. The 4D theater, the Digital Space dome theater and the three classrooms will be used for poster and parallel sessions.

To satisfy vital needs, the two dome theaters, installed with advanced projection system, and the 4D theater will be ready for presentations by planetarians and vendors. We will take full advantage of the planetarium to hold vendor presentations and some of the parallel sessions. Plenty of planetarium time will be the highlight of this conference.

As the secondary venue, Hotel Nikko New Century Beijing, a 5-minute walk away from Beijing Planetarium, will provide an excellent environment for the opening ceremony and business meetings.

Accommodations

A wide variety of hotel options are avail-
able for delegates at IPS 2014. The official conference hotel, Hotel Nikko New Century Beijing, and Xiyuan Hotel, both within a 5-minute walk of all conference venues, offer up to 1,000 rooms of different sizes at different prices. Both are fitted with modern amenities one would expect from a convention hotel.

Hotel Nikko New Century Beijing has four kinds of rooms with prices ranging from CNY560 to CNY1,000. Xiyuan Hotel has four kinds of rooms with prices ranging from CNY850 to CNY850. (As of November 1, 2013, 1 CNY= 0.164 USD and 0.12 EURO.)

Apart from the above two hotels, there are other options, including both economic and luxury hotels.

Beijing Planetarium and the two hotels are located on North & West 2nd Ring Road, only 27 km from Beijing Capital Airport. You can easily reach there either by taxi or subway. Thanks to the well-developed underground transport network in Beijing, it is convenient to go anywhere in downtown from the Beijing Zoo station of Line 4, where Beijing Planetarium and the two hotels are close to.

IPS2014 will be held in June, when the weather in Beijing is the best of the year with moderate temperature (25-32 degrees C), and moderate rainfall creating the best air quality.

All the food and beverages will be provided by five-star hotels with consideration of the different cultural background and food habits of attendees, so as to create a healthy and green IPS 2014.

Conference program and fees

The conference registration fee is US $450, which includes the welcome reception, opening ceremony, keynote speech, vendor demonstrations, exhibit hall access, all sessions, mid-conference tour, a conference satchel and materials, and all breaks and lunches.

You will be served with buffet lunches on June 23-26. On June 27, the last day of the conference, we will host you in the banquet hall of Hotel Nikko New Century for a luncheon featuring traditional Chinese round tables.

The gala dinner will be held in the evening of June 27, when the century-old Beijing Quanjude Roast Duck will surprise your taste buds and traditional performances will amaze you with their authentic Chinese characteristics. Anyone who would like to attend the dinner needs to pay US $90 which covers the dinner, performances and transportation.

Mid-conference tour

In the afternoon of June 25, IPS 2014 is offering a mid-conference tour. The tour will cover the fee of transportation from Beijing Planetarium and the entry ticket to the scenic spot.

Route 1 is a tour to the Temple of Heaven and Ancient Observatory. During this tour, you will visit the Temple of Heaven, an imperial construction reflecting ancient Chinese astronomical thoughts, and see the oldest astronomical equipment in Ming and Qing Dynasty of China at the Ancient Observatory.

The other routes are the Palace Museum and Beijing Aerospace Town. The Palace Museum is the Chinese imperial palace and one of the greatest palaces in the world, showcas-
and researched. The station is equipped with fixed stars and galaxies are observed. Station is an optical astronomy observatory, one of the National Astronomical Observatories under the Chinese Academy of Sciences.

CNY4,500 per person. The tour will take four days and cost about CNY1,500 per person.

Optional tours (pre/post conference)
You may choose among the three pre-conference or post-conference tours below, which we believe will make your stay in China even better.

Xi'an
Among all the ancient imperial capitals in China, Xi'an is the one that had been capital for the longest time, hosted the most dynasties, and exerted the greatest influence in Chinese history. It is one of the four great ancient capitals in the world, the birthplace of Chinese civilization, the cradle of Chinese nationality, a prominent representative of Chinese culture, and the starting point of the Silk Road.

Along with attractions such as the Giant Wild Goose Pagoda and Xi'an Ancient City Wall, the Xi'an tour will take you to museums where you will experience the Yangshao culture, which existed 5,000 years ago, see the Terra Cotta Warriors and Horses, visit the Yang Mausoleum of the Han Dynasty, and learn about the history of Shaanxi. You will be accommodated in a five-star luxury hotel. The tour will take four days and cost about CNY4,500 per person.

Chengde and Xinglong Station
A visit will be paid to Xinglong Station, one of the National Astronomical Observatories under the Chinese Academy of Sciences. Affiliated to the open optics lab of the National Astronomical Observatories, Xinglong Station is an optical astronomy observatory, where fixed stars and galaxies are observed and researched. The station is equipped with such important astronomical instruments as LAMOST and the 2.16-m optical telescope. In this tour, you will also stand on the best place for astronomical observation—the picturesque Wuling Mountain—and get a personal experience of the largest existing imperial land and imperial temples in China.

Chengde, with its famous Imperial Summer Resort, will give you the royal treatment during your summer stay. The tour will take two days and cost about CNY1,500 per person.

Great Wall
As a Chinese proverb goes, he who has never been to the Great Wall is not a true man. Apart from a trip to the Great Wall and the ancient royal mausoleum, this route also includes a tour around the whole city of Beijing and a trip to Bird's Nest, Water Cube and Wangfujing Snack Street.

You may also go to Hong Kong and Macau for a short stay before the conference. We have contacted the Hong Kong Space Museum and the Macau Science Center and they will provide you with assistance during your trip there. More detailed information will be released soon.

(Attention: a visa would be needed if you enter mainland China from Hong Kong or Macau.)

If you want to extend your stay to the Asian-Pacific region beyond these days, please consider visiting also our friends in Japan. The IPS suggests an optional post-conference tour to Tokyo. Details will be sent out by the IPS soon as they are available.

Time to start planning
We encourage you to begin planning for the conference and consider presenting and actively participating in the sessions. This biennial conference is the highlight of our profession and literally depends upon your participation to make it successful.

It is an opportunity for attendees to exchange ideas, make professional progress, listen to guests’ speeches, meet new colleagues, reconnect with acquaintances, and more importantly, to learn and experience what is going on in the planetariums field throughout the world.

As documents required for visa application are different according to countries and regions, please contact your local Chinese embassies and consulates for information. Please do not hesitate to contact us if you need an invitation letter or other official documents to apply for a visa and we will provide it as soon as possible. You can also visit the website of IPS2014 for more information.

There will also be media friends and Chinese educational officials attending the conference. We hope the conference will be a worthy stimulus on astronomy education.

You can make registration for IPS2014 either online or on-site. It is expected that online registration will open in November 2013. Discounts are available for online registration.

We look forward to your presence at IPS 2014 and hope to present a forward-looking conference where we will envision the future of planetariums together.

Visit our conference website at www.ips2014.org for updated information. We will keep you informed with more details continuously. See you next year in Beijing!
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METEOROLOGY

for SciDome • 2014
Minutes of the IPS Council Meeting

South Tyrol Planetarium Meeting Room
Gummer, near Bolzano/Bozen
South Tyrol, Italy
August 9-10, 2013

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

Affiliate Representatives:
Association of Brazilian Planetariums (ABP) - Alexandre Cermen
Association of Dutch Speaking Planetariums (ADSP) - Loris Ramponi for Jaap Vreeeling
Association of French Speaking Planetariums (APLF) - Agnes Acker for Marc Moutin
Association of Mexican Planetariums (AM-PAC) - Dale Smith for Ignacio Castro Pinal
Association of Spanish Planetariums (APLE) - Javier Armentia
Australasian Planetarium Society (APS) - Warik Lawrence
British Association of Planetaria (BAP) - Jenny Shipway
Canadian Association of Science Centres (CASC) - Ian McLennan
Chinese Planetarium Society (CPS) - Jin Zhu
European/Mediterranean Planetarium Association (EMPA) - Manos Kitsonas
Great Lakes Planetarium Association (GLPA) - Jeanne Bishop
Great Plains Planetarium Association (GPPA) - Lars Broman for Jack Dunn
Italian Association of Planetaria (IAP) - Loris Ramponi
Japan Planetarium Association (JPA) - Kaoru Kimura
Middle Atlantic Planetarium Society (MAPS) - Patty Seaton
Nordic Planetarium Association (NPA) - Aase Roland Jacobsen
Pacific Planetarium Association (PPA) - Susan Button for Benjamin Mendelssohn
Russian Planetarium Association (RPA) - Lidia Dudashkina for Zinaida P. Sitkova
Society of German Speaking Planetaria (GDP) - Christian Theis
Southeastern Planetarium Association (SEPA) - John Hare
Southwestern Association of Planetariums (SWAP) - Rachel Thompson
Not Present:
Rocky Mountain Planetarium Association (RMPA) - Mike George

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
Simonetta Ercoli- IAP
Lars Broman- Chair, IPS Awards Committee
Dr. Dale Smith- Chair, IPS Publications Committee
Susan Button - Chair, IPS Portable Planetarium Committee
Celso Cunha- President of Rio Planetarium Foundation, Rio de Janeiro Brazil
Steve Baker – IPS 2016 Conference Bid, TELUS World of Science, Edmonton, Canada
Marc Moutin- IPS 2016 Conference Bid- Cité de l'espace, Toulouse, France
Dr. Maciej Ligowski and Monika Malinowska- IPS 2016 Conference Bid, Copernicus Science Center, Warsaw, Poland
Shoichi Itoh- National Astronomical Observatory of Japan (NAOJ)

The meeting was called to order at 9:25 a.m. by President Thomas Kraupe. Thomas welcomed the Council Members and guests and opened the meeting with introductions from everyone in attendance. Thomas recognized new Council members and reviewed the format for the Council meeting as well as changes in the agenda.

The Secretary's Report on the Minutes of the 2012 Baton Rouge, Louisiana Council Meeting had been previously published in the December 2012 Planetarian.

The Minutes were approved.
Treasurer Shawn Laatsch presented the Treasurer's Report. Council reviewed and discussed specifics of the 2012 Financial Report, the mid-year 2013 Budget, and the proposed 2014 Budget. APS Representative Warik Lawrence pointed out a discrepancy in the 2012 Report for income that the Treasurer will adjust in the balance column. CASC Representative Ian McLennan pointed out that in reports the term “profit” should be replaced with the term “surplus” in keeping with the Society’s not-for-profit status. The Audit Report of 2012 confirmed that the treasury is in good standing and the document has been posted on the Council Group Site.

The Treasurer's Report was filed.

As Membership Chair, Shawn reported that the total membership as of June 2013 was 665. Shawn confirmed that automated reminders are distributed in January and February to notify membership of dues renewal procedures.

The Membership Report was filed.

Past President Dave Weinrich presented his Past President's Report which will be printed in the September 2013 issue of the Planetarian. Dave reviewed the progress on some of his presidential objectives and expressed his optimism for completion and extensions for the work on those projects throughout the next 2 years.

President Thomas Kraupe delivered the President's Report. This report will also be published in the September 2013 issue of the Planetarian. Thomas outlined his plan for working with Council and the membership in setting a strategy for moving IPS forward. A Vision 2020 initiative will address how IPS can reach the goal of being leaders in the fields of education and inspiration— not abdicating this role to others. Part of this process requires a reorganization of the committee structure and a more active Council participation throughout the year.

The Past President's and President's Reports were filed.

Affiliate Reports
President Thomas Kraupe reiterated the importance of Council Members' participation as active representatives of their affiliates—not just at the annual Council Meeting, but throughout the year. This re-
Standing Committee Reports

President Thomas Kraupe discussed with Council his aim to make the committee structure more effective and goal oriented. As he announced in the June 2013 issue of the Planetarian, the following committees are no longer viable: Full-Dome, Outreach, Professional Services, Technology, and Website. The Web Committee will return to its original function as part of the Publications Committee with Alan Gould as Webmaster and Sharon Shanks as Website Editor. Two new committees will be formed: Science and Data Visualization Task Force—chaired by Dr. Mark SubbaRao, and Planetarium Design and Operation Committee—chaired by Ian McLennan. Details on the missions and objectives of these two new committees will be forthcoming. 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 Innovation and Technology Award honorees will be presented to the membership at the IPS 2014 Conference. Council discussed the nominees presented for the Technology and Innovation Award.

* Patty Seaton moved to limit the number of awardees to no more than 2, seconded by Rachel Thompson and approved by Council.

* Shaw Laatsch moved to approve the recommendations of the Awards Committee for 2 individuals to receive the Technology and Innovation Award, seconded by Javier Armentia and approved by Council.

The list of IPS Fellows was presented and discussion followed.

* Shaw Laatsch moved to approve the recommendations of the Awards Committee for 7 individuals to be named as IPS Fellows, seconded by Javier Armentia and approved by Council.

President Thomas Kraupe suggested that Council and the Awards Committee address the inconsistencies within the reporting of the committee as well as the concerns of guidelines for the awards as part of the review structure of all the committees under the IPS Vision 2020 and revisions of the Standing Rules. Affiliates are encouraged to submit nominations for IPS Awards to the Awards Committee.

Elections Committee

President Thomas Kraupe shared Elections Committee Chair Martin George’s IPS Elections Committee report. The 2012 electronic ballot election ran smoothly and is expected to follow the same procedure in 2014. Nominations for officer candidates for 2015/16 will officially close at the annual General Meeting of IPS in Beijing in 2014. Affiliate Representatives are urged to encourage their membership to consider running for an IPS office as well as participating in the voting process.

Publications Committee

The IPS Publications Committee Chair Dale Smith presented his report. Executive Editor Sharon Shanks continues to maintain the journal’s excellence in conjunction with...
her team of authors, columns and advertisers. The article titled “Under One Dome” continues from last year, and a practice of including “Guest Editorials” has recently been initiated. The current edition of the Planetarian is available on the IPS Website in the Members Only area, and all previous editions are posted in the open area of the IPS Website.

The Alexandria IPS 2010 Proceedings were distributed in January 2013, and the Baton Rouge IPS 2012 Proceedings will be distributed this fall.

The 2013 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”) has begun and will be distributed later this year. The Directory has been moved from the Members’ Only Area of the IPS Website to the public area, thereby making this valuable resource more widely available.

Webmaster Alan Gould was instrumental in facilitating the move and posting prior editions of the Directory so they are available as archived resources.

Chair Dale Smith and his team will be working making the Directory more useful with searchable features.

President Thomas Kraupe on behalf of Council expressed appreciation for Dale and his committee’s dedication and excellence in contributing to the valuable resources for IPS.

Council also recognizes Editor Sharon Shanks’ commitment to the high standards of the Planetarian.

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 is transitioning material to the new IPS Website and continues to focus on updating links and utilizing blogs and podcasting. Work is progressing on collaborating with regional groups on the development and implementation of the U.S. national and state standards for science and astronomy.

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 1000 slides remain to be scanned). About 20,000 images will be identified and the committee is collaborating with Webmaster Alan Gould and Editor Sharon Shanks to share the images.

The images in the opening video sequence that was shown a IPS 2012 in Baton Rouge were from the IPS Archives, and John’s committee will provide such resources for future endeavors.

President Thomas Kraupe thanked the Historian for his efforts on preserving the history of IPS As part of what we are, our roots, our growth, this is important in research branches as well.

There will be a Memorial Presentation at IPS 2014 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 continue to promote IPS around the world, including Ukraine, India, Korea, and Thailand. Experience with the 2012 Baton Rouge Conference Scholarships will help with the next round of applications for IPS 2014 Beijing. The Planetarium Closure procedures developed by the Committee were utilized in several circumstances over the last year. The Committee will continue its investigation into providing translation services at conferences, especially for IPS 2014 in Beijing.

Portable Planetarium Committee

Chair Susan Button presented her report on the Portable Planetariums. The Committee’s emphasis on live interactive lessons, especially in small and portable domes, resulted in several sessions at MAPS, GLPA and Baton Rouge. It is crucial for the IPS Portable Planetarium Committee to have a portable planetarium representative from each IPS Affiliate. This representative needs to be responsible for periodically sending Susan news and contacts for portable domes in the affiliate’s region. Please send Susan the name and contact information of this individual.

Script Contest Committee

Chair Thomas Kraupe reported that this committee’s work will become part of the bigger mission of the Awards Committee. Manos Kitsonas commented that the Eugenides Foundation will maintain its support of IPS and will work with the officers on the details of the new awards format.

The Ad Hoc Committee Reports were filed.

Constitution Matters

Secretary Lee Ann Hennig reported that major revisions to the Standing Rules Appendix C: Conference Guidelines were underway and would be forwarded to Council for electronic approval. Other changes to consider will be: revisions/updates in appendices, general consistency and clarification edits to keep the document current.

Unfinished Business

Survey of Membership will be coordinated with the IPS Vision 2020.

Awards will be coordinated with the revisions of Committee structure.

New Business

MOU (Memorandum of Understanding) with several organizations is underway and will be discussed with Council once draft documents are available.

IPS Summer School (professional development opportunities): IPS should help elevate our profession by providing/sponsoring/supporting these endeavors and exploring training/internship/opportunities for potential planetarium professionals. A proposal should be ready to present to Council in Beijing 2014.

Discussion from Council included suggestions regarding existing projects like “A Planetarian’s Experience in Italy,” National Science Foundation (NSF) summer institutes in the US, and collaborations with universities.

IPS Vision 2020: President Thomas Kraupe described the background for a perspective of how IPS can chart a roadmap to the future. A President’s two-year term is not long enough to affect substantial change; it involves more than two years. We are a working, healthy organization, but how can we be more responsive to the membership and meet the challenges of our profession as it grows?

The future of our organization depends on the opinions of our membership as well as the officers and Council. President Elect Paul Knappenberger presented a summary of how we can develop a collective vision of what we want IPS to be. Every 10 years or so we should evaluate the state of the organization. This is an ongoing process and must be inclusive. In order to accomplish this we need to ask the following questions:

How can IPS better serve and support its membership?

How do we strengthen ties with professional opportunities/other organizations?

How do we improve professional development based on research and best practices?

(Continues On Page 40)
The moment of inspiration when he decides to fly to Mars one day.

This is the moment we work for.
If you’ve been reading the President’s Message column, you’ve had an introduction to the new Science and Data Visualization Task Force. This article is designed to expand upon that introduction.

For this initiative to be successful, we need both the attention of and feedback from the planetarium community at every step of the process.

Between the growth in the capabilities of digital planetariums and the explosion of data from a variety of sources, we believe that this is a critical time for the planetarium. How do we best position the community to take advantage of these new and expanding possibilities? The goal of the task force is to answer that question, preparing us for the big data era.

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Data to dome
The mission of the Science and Data Visualization Task Force is to streamline the process of going from data to dome, increasing the potential for scientific communication and storytelling in the planetarium.

In the same way the “Farm to Table” movement has improved the culinary landscape by reducing the middlemen between the farmer and chef, “Data to Dome” is aimed at reducing the effort needed to go from scientific study to planetarium visualization.

We hope to bring the planetarium closer to the science and to make domain scientists more aware of the power of our immersive visualization tools. Our community has built visualization facilities of incredible potential all across the globe. The easier we make the path from science result to dome visualization the more fully we will be able to utilize them.

Communication and storytelling are specifically called out in this mission statement. While the activities of the task force will often involve technical details of data formats and protocols, the purpose of these activities is to enable planetarium presenters and creators to do their job more effectively.

The task force has identified some initial areas of activity. These include: 

Preventing planetariums for the massive stream of data that will come from next generation telescopes, satellites, experiments and computational simulations.

The task here is significant. The European Space Agency’s Gaia mission, for example, will increase the number of stars with measured distances by a factor of 10,000 to one billion. The Large Synoptic Survey Telescope project will open up the time domain in astronomy, issuing alerts for one million changing objects every night. Over 10 years of operation, it will generate approximately 200 petabytes of scientific data.

Even these huge quantities of data are dwarfed by what is coming out of the computational sciences. A simulation used in a
two minute sequence of a recent Adler Planetarium show consisted of nearly 400 terabytes of data.

Creating professional development opportunities aimed at developing more “data savvy” planetarians.

The task force is working towards a future where more data will be available from more recent measurements spanning more scientific domains. This broadening of sources and increase in data stream rates will put an increased burden on the planetarium professional to understand, visualize and interpret. Professional development is key to making sure that planetarians are able to take full advantage of the resources available to them. These opportunities need to span disciplines such as science, scientific visualization and science-communication.

Developing and promoting best practices for data visualization in the dome.

Visualizing data for the public presents a unique set of challenges. Choices of color, methods of visualizing qualitative or quantitative information, and selection effects that are understood by professional audiences can be distracting or confusing for a public one. Likewise, the fulldome environment offers unique opportunities that need to be studied in order to be fully exploited.

Connecting data suppliers with vendors and planetarium end-users by setting and recommending standards for real-time (or near real-time) scientific content distribution: imagery, videos, tabular data, etc.

Standards and their adoption are a crucial factor in achieving the task force’s mission to streamline the process of going from data to dome. Without clear and well adopted standards, content producers such as NASA, ESA and ESO will have less motivation to produce products for the planetarium community. Without community-endorsed standards, vendors will have to define their own, fragmenting our community and reducing opportunities for collaboration.

Encouraging the visualization of a wide range of scientific data in the dome (moving beyond astronomy).

The potential now exists to visualize anything in the dome. We’ve seen excellent examples of earth science and a handful of biology/medical visualizations. Many planetariums have presented music shows as an economic necessity, but have not embraced other scientific topics for lack of in-house expertise, content and the inherent necessity to somewhat redefine their identity.

Thus, special efforts need to be made to disseminate such content. One possibility may be the concerted attention to large-scale scientific projects (e.g. the Gaia project in astronomy), such as climate change or genomics. The fulldome digital planetarium as an all-purpose visualization environment is still just beginning to be explored.

Redefining interactivity and networking.

To date, interactivity in planetarium software most often means the up-front ingestion of data describing a static universe that can be switched on or off, played back and be browsed with a freely moving camera. Although even just this degree of freedom may overwhelm the majority of planetarians for lack of intricate knowledge of the data sets and, consequently, lack in practice to move about them, researchers will find this sort of visualization unappealing.

A mere data viewer and movie player is not enough, they need to be able to manipulate, mark and derive metadata from the data sets displayed.

The best visualization is one that creates new data sets along the way. We, therefore, urge dome software developers for an increase in interactive capabilities along with a broadened support of the underlying data sets. We envision a planetarian who does not merely point at the stars but pulls apart the universe in front of the eyes of his audience.

Planetariums are about the sharing of an experience with others. Through networked planetarium sessions (e.g. “dome-casting”), we not only increase our audiences but establish a new communication tool for researchers among themselves and with the public.

Advocating for the inclusion of dome visualization tools in standard scientific analysis and visualization packages.

If part of streamlining the path from data to dome is bringing the planetarium closer to the science, the other part is bringing science and scientists closer to the planetarium. Our visual language (the dome master) is not yet established anywhere else. Our profession needs to do more in terms of its visibility in the scientific community, and including dome visualization tools in standard scientific analysis packages will increase the number of scientists collaborating with planetariums and also increase the visualizations available to planetarians.

Encouraging planetariums to make their facilities available to researchers from their communities to use as a visualization tool.
Why is it that many researchers praise the capabilities of a newly-installed fulldome system, but never come back? Because the use of any new tool in science requires an up front expense on their side, most often in the form of their precious time and research money. It comes down to a problem of cost vs. revenue, and in reality, the justification for scientific visualization involving few individuals is much weaker than that of the education of large laymen audiences.

Since, for these reasons, it is much more difficult for research to acquire large scale network of visualization facilities, our profession has now, for the first time, the unique opportunity to give something back to the scientific resources we have always drawn upon.

Allowing these researchers (and some of their tools) to access our facilities would create a richer dialog between science and education building collaborations that will extend the reach of the planetarium and hopefully advance science as well.

Some steps in the right direction
Aligning to the Virtual Observatory Standards: The WorldWide Telescope

WorldWide Telescope (WWT) is an emerging planetarium software platform freely available from Microsoft Research. It is in a unique position in that it was designed simultaneously as a tool for researchers and for public education.

WWT has adopted many standards from the virtual observatory (VO). For example, catalog data can be imported as VOTables, which have several nice properties. The metadata is carried along and described by Unified Content Descriptors that precisely define the meaning of a data column, allowing WWT to recognize them as coordinates or brightness values. WWT then automatically suggests how to visualize them.

VO data APIs, such as the cone search, are utilized as well. The user can query for catalogs by sky location and keyword and then select from the returned lists of datasets for visualization. This ease of going from dataset discovery to dome visualization is exactly the “Data to Dome” philosophy.

At the same time, WWT offers a broad interface for geoscientific data. Geographic point data can be imported and animated directly from text files and even the clipboard. A flexible API (Narwhal) and an interactive plugin for MS Excel allow the manipulation of data displayed on the dome in real time which is particularly interesting for higher level education and even research.

WWT facilitates the import and georeferenced positioning of textured 3D models and of large scale customized terrains, a feature that is rather unique among virtual globes. Programs (tours) complete with narration and music can be pre-scripted and easily distributed. The software scales from desktop to multi node clusters and is thus suitable for all levels of education while visualizations can also be prepared and tested by researchers who may only occasionally visit a dome.

Inclusion with science software packages: the yt project

yt is a software package for analyzing and visualizing volumetric, multi-resolution data from astrophysical simulations, radio telescopes, and a burgeoning interdisciplinary community. This open source project has reached out to the dome community, adding the functionality to create high resolution volumetric renderings in the domemaster format.

This addition dramatically increases the ability of the computational science community to create fulldome visualizations. By embedding visualization tools in the analytical routines and libraries used to conduct analyses for publications, yt hopes to bring the dome communities and computational science communities closer together.

Providing context: the Virtual Astronomy Metadata Project

The Virtual Astronomy Metadata Project (VAMP) defines an image format for astronomical public outreach images. Metadata is embedded in the image headers. This not only includes technical information, such as the WCS coordinates needed to position the image on the sky, but also information specific to the public images.

A title, description, credits and links to more information are all included, greatly simplifying the work of the content creator. There is currently wide support for this format among content providers such as Hubble, Chandra, Spitzer, and ESA. Thus, we recommend full adoption in the planetarium community as well.

How can you help?

What should the planetarium of the future look like, and how will planetariums be used? The task force is in the process of preparing examples of future “use cases,” which will also be used to inform the community on its activities. We would like to encourage you to send in your own “use cases!” Please forward them to the task force chair Mark Subba Rao (msubbarao@adlerplanetarium.org).

Here are some examples of the use cases we are currently working on:

Lars Lindberg Christensen suggests an Astronomical Weatherman functionality that allows the planetarium operator, every morning, to select interesting dataset previews downloaded overnight—planetary maps, images of sky objects, tabular data, event data, etc.—and mark up the full datasets and metadata (descriptions, web URLs, licensing) for download and for possible inclusion in show segments during the day.

Martin Ratcliffe describes a future supernova show based on LSST data. The presenter downloads last night’s supernovae discoveries (in some cases the galaxy identification can be included) and the 3-dimensional position of the supernova creates a location identity in SDSS.

At the start of a show, the presenter presses a button and the night sky display shows a sampling of the 1000 supernovae discovered the previous day. The presenter can fly out of our Milky Way and show the relative positions of the host galaxies. Over the longer term of LSST, a bird’s eye view of the universe could show a realtime time-lapse of supernovae going off covering years of data.

GEOMAR in Northern Germany is a multidisciplinary research facility focused on the oceans, branching into geology, geophysics, paleoclimatology, oceanography, atmospheric sciences, fisheries, marine biology and biochemistry.

As a common portal to merge scientific results, Tom Kwasnitschka operates the ARENA, a visualization environment using WWT exclusively dedicated to scientific audiences. It turned out that researchers rejected a dome above them since most earth science topics are perceived “on or beneath the ground” in contrast to stars, therefore the ARENA is a lower hemisphere populated by up to four researchers at once.

They are currently struggling with issues of accurate georeferencing and interactive data manipulation. It is planned to use several of these simulators for remote scientific collaboration as well as for domecasts to the planetarium community. Lack of interest from this side currently prohibits the allocation of resources towards public content development.

Learn more about the International Planetarium Society at www.ips-planetarium.org
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In 2001, the Québec Ministry of Education adopted a new educational program for its elementary and secondary schools that sets goals for astronomy content. Among the required subjects teachers must explore with their students are such phenomena as diurnal motion, seasons and lunar phases. This requirement is difficult for teachers, who often lack a basic knowledge of astronomy.

Moreover, most of the astronomical phenomena covered in the Québec curriculum occur outside normal classroom time and over fairly long periods (weeks and months), and so they are hard for students to observe directly. Also, Québec schools are usually ill-equipped to demonstrate the often complex three-dimensional processes behind the most common astronomical phenomena.

Fortunately, a planetarium can make up for shortcomings in classroom lessons by presenting extremely realistic simulations of many astronomical phenomena at any time of the day. But do these simulations really help young people learn?

We must ask ourselves what type of knowledge students build when they visit a traditional, geocentric planetarium, especially since that type of planetarium replicates exactly what is seen under the real night sky. Indeed, traditional planetariums present young audiences with a single point of view of the sky, the geocentric view we have from Earth’s surface.

Also, this simulation is basically two-dimensional, very often reinforcing the naïve view of the sky as an overturned bowl placed above our heads with stars “stuck” to its inner surface.

The research

Research in science education, particularly the socio-constructivist perspective, reveals that when most children (and many adults) observe the night sky and the astronomical phenomena from our exclusive geocentric perspective, they immediately build inaccurate personal explanations for these phenomena. These explanations, which are usually very different from those accepted by the scientific community, are called “misconceptions” and often hinder learning at a traditional planetarium.

A classic example of such a misconception concerns diurnal motion. Many students believe it results from the sky moving over our heads and carrying celestial bodies from east to west. As the history of astronomy shows, all of mankind long thought the same thing. Indeed, it took centuries for scientists and philosophers to overturn the notion of a fixed Earth located at the centre of the cosmos.

As for the lunar phases, a common misconception is that the moon changes appearance because Earth casts a shadow on its satellite. This confusion occurs because people see ev-

Teaching the phases of the moon in a digital planetarium

Pierre Chastenay
Rio Tinto Alcan Planetarium Montréal, Québec, Canada and Université de Montréal chastenay@astro.umontreal.ca

A view of the inflatable dome installed at the centre of the Planétarium de Montréal theatre. The planetarium had been closed for several months, awaiting its relocation, and the central Zeiss projector had been stowed away before becoming an exhibit in the new Planétarium Rio Tinto Alcan (Photo: Pierre Chastenay). Background: Galileo’s sketches of the moon. Wikimedia Commons.
every day how shadows of familiar objects form; some of them also know that lunar eclipses involve Earth’s shadow and use that to explain the lunar phases. Finally, the moon’s appearance as a flat disc hung in the sky does not help people grasp the three-dimensional nature of the lunar phases mechanism.

Since the same causes usually produce the same effects, can we believe that the knowledge built by students attending a lunar phase demonstration in a traditional, geocentric planetarium will differ from the spontaneous explanations they build observing the real night sky?

Despite the best efforts of those who develop and present these shows, it is very likely that students will leave the theatre with the same personal explanations as before. Students may even be more confused and unable to reconcile what they saw, the explanations they heard, and the mental models they invoked to make sense of their observations.

Breaking the glass ceiling

Fortunately, the digital revolution underway in immersive theatres offers a solution to this problem. For the first time in planetarium history, digital video projection systems and sophisticated 3D astronomy software finally let us break the “glass ceiling” of the dome theatre to explore the depths of the sky, the third dimension.

These new tools turn the planetarium into a true spacecraft, showing phenomena from new perspectives and different viewpoints. This move from geocentrism to allocentrism and from two-dimensionality to three-dimensionality represents a profound paradigm shift for planetariums and it opens up new and exciting possibilities in educational research.

This article will look at a doctoral research in science education that I conducted in a portable, digital planetarium with the aim of using this new tool to teach students aged 12 to 14 how the lunar phases occur.

Several theoretical sources and many research findings were summoned to help develop the planetarium session I set up as part of this research, and I cite the main ones here. Regarding educational research in planetariums, nearly 50 years of scientific work has shown that a session led by an actual person on site has a clear advantage over a prerecorded show. Participatory approaches, whereby students who observe an astronomical phenomenon are active, engaged, take notes, make sketches and verify their hypotheses in the dome theatre, have also proven successful.

Furthermore, research done in planetariums shows that student’s projective spatial abilities are very important when teaching astronomical concepts endowed with a strong spatial component, like the lunar phases or the seasons. Fortunately, these projective spatial abilities can be learned and facilitated by a session in a planetarium.

With respect to research in science education, we based our approach on models of conceptual change that regard learners as builders of their own knowledge, using their (mis)conceptions as their only tools to make sense of the world around them.

In these models of conceptual change, it is important that learners be aware of their own personal explanations, their misconceptions, so that they understand their limitations and become more receptive to the scientific models put forward. This emphasis on conceptions is made easier in a rich learning environment, which a digital planetarium can be.

I also thoroughly studied educational research approaches and findings related to virtual reality devices, particularly in Cave Automatic Virtual Environments (CAVE) and “window-on-the-world” semi-immersive environments. In all cases, research concludes that a large screen, located far from viewers and completely filling their field of vision (the very definition of a planetarium) creates a strong feeling of presence in the simulated environments.

Research also shows that a rich audio environment that is spatialized and synchronized with the movement of the images helps convince users of an immersive environment that they are in a realistic and credible universe. All these factors increase a user’s feeling of presence (the feeling of

1 Allocentric: from allo-, a prefix meaning “other” and -centric meaning “centred on.”
“being there”) and are strongly correlated to better learning when virtual environments are used for educational purposes.

Finally, I drew inspiration from recent studies on computer-aided teaching involving two- and three-dimensional simulations of astronomical environments to design my own teaching session, which I describe below. These studies convinced me that it was important to assist learners through proven teaching scenarios and solid conceptual safeguards and scaffolding throughout the activity. Otherwise, many new misconceptions are sure to appear.

The session begins

I began my session with six students (four boys and two girls) by briefly presenting the projection equipment used in my study, including the computer and the software (DigitalSky2 by Sky-Skan Inc.), as well as the central video projector and an inflatable dome six metres across. This step was designed to familiarize students with the new environment in order to lessen the “mystique effect” of a new setting that often gets in the way of learning.

Next, I asked students to observe the lunar phases daily for 30 consecutive days (with accelerated diurnal motion) and draw on a lunar calendar how the moon looked each day. This activity, presenting the geocentric point of view on the phenomenon, was intended to acquaint students with the sequence of the phases, from one first quarter to the next.

They saw that the moon first waxes till it is full and then wanes till it is a new moon. They also saw that the terminator always moves from right to left on the lunar disc (in the northern hemisphere), that the moon is visible in the evening for the waxing phases, for the entire night around full moon, and in the morning for the waning phases, and finally that it is invisible for a few days around the new moon. With these observations, my aim was to show students that the phenomenon is regular and predictable.

After students completed their observations, I asked them to comment on what they had observed and to take a stab at explaining the phenomenon. The most common misconceptions often take shape at this time, the moment when they are summoned.

A virtual spacecraft

I then suggested turning the planetarium into a virtual spacecraft so that students could get a closer look at the moon and its intriguing changes in appearance. During this “virtual journey” through space, the young people discovered that the moon is spherical and revolves around Earth in just under a month on an almost circular orbit. They saw that the moon shines by reflecting light from the sun toward Earth and that because of this, half of the satellite is always lit and the other half is always dark.

These concepts are key to understanding the lunar phase process, namely that the moon changes appearance depending on the fraction of its sunlit hemisphere visible from Earth. This fraction itself depends on the moon’s position in its orbit around Earth.

When participants travel virtually through a three-dimensional and highly realistic simulation of the solar system, they may extend what they learn about a given phenomenon to other similar astronomical situations.

Hence, after they studied the lunar phases, I asked students to observe Venus and Mercury to see whether these planets also show phases when seen from Earth (they do indeed and for very similar reasons as the moon). Next, we landed on the moon to observe the phases of Earth, which greatly surprised students since they did not realize Earth could have phases. After visiting the moon, we headed back to Earth and wrapped up the session.

Assessing prior knowledge

Because I was trying to measure the impact of a digital planetarium session on how children aged 12 to 14 understood the lunar phase process, I wanted to assess the knowledge and conceptions of the phenomenon held by the six students before, during and immediately after the teaching session and to show how their conceptions were evolving as the session in the planetarium played out.

Their conceptions were explored with a series of written questionnaires, including essay questions (text and drawings) and multiple-choice questions. Hands-on exercises were also included. The questionnaires examined what they knew about the moon: its visibility during day and night, its location in space, its size compared with Earth and the sun, the lunar phase process, and the names of the main phases.

In one exercise, they attempted to place photos of the main lunar phases in the right order. In another, they had to show the orbital motions of the moon and Earth around the sun using a golf ball, a tennis ball and a large beach ball. Finally, each student had to explain aloud in his own words how lunar phases occur.

All these activities were carried out before the planetarium session, and then repeated immediately afterward. They resulted in abundant research material: written answers to the pre- and post-session questionnaires in addition to spoken comments by the researcher and participants recorded during the pre-session, dome theatre session and post-session.

I then transcribed and analyzed spoken comments made by students throughout and compared it with their questionnaire answers before and after the session. In five of the six students, I found significant changes in their conception of the lunar phases.

It would take too long here to go into all my findings, which were the subject of a doctoral thesis in science education at Université de Montréal accepted in January 2013 and which will be published in a journal of education at a later date.

Changing conceptions

Let me, however, give two examples of these changing conceptions, which can be linked directly to the use of a digital planetarium to navigate through a highly realistic simulation of three-dimensional astronomical space.

On the pre-test, 13-year-old Benoît ² said that the lunar phases resulted from fog hiding our satellite, a fairly common misconception similar to that involving Earth’s shadow (i.e something hiding or blocking our view of the moon).

During the session in the dome theatre, his conception changed. Benoît now believed that the full moon marked the end of a “filling” process whereby a new moon gradually

² All names given are fictitious to protect participants’ privacy.
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Interaction and learning outcomes in live public planetarium presentations

Abstract: We studied the impact of oral formative assessment—as measured by the interactivity between presenter and study participants—on learning success in mixed-audience, live planetarium constellation programs. Audio recordings of ten programs given by five experienced planetarium educators in late 2009 were transcribed and analyzed. Participants attending presentations with either high (79–96 interactions/hr) or low (19–42 interactions/hr) interactivity scored 7–16% higher on learning assessments than those whose presenters had mid-range levels (56–62 interactions/hr). Because of the study design and sample size, it was difficult to disentangle the influence of the presenters’ interactivity from the influence of the presenters’ other characteristics and behaviors.

Introduction

Although formative assessment has been shown to help teachers cultivate stronger positive student outcomes in traditional classrooms (Oyedeji 1994; Sadler 1989; Shepard 2003; Crooks 1988), it appears to be a poorly researched topic in a planetarium or science center setting.

Bell and Cowie (2001) describe formative assessment as “assessment which provides feedback to students (and teachers) about the learning which is occurring during the teaching and learning, and not after. The feedback or dialogue is seen as an essential component of formative assessment interaction.”

Gijbels and Dochy (2006) summarize the benefits of formative assessment: “increasing formative assessment leads to the following effects: reactivating or consolidating prerequisite skills or knowledge prior to introducing new material; focusing attention on important aspects of the subject; encouraging active learning strategies; giving students opportunities to practise skills and to consolidate learning; providing knowledge of outcomes and corrective feedback; and helping students to monitor their own progress and to develop self-evaluation skills; guiding the choice of further learning activities to increase performance; helping students to feel a sense of accomplishment.”

Crooks (1988) states that “the frequency of teacher questioning has generally been shown to be positively related to student achievement.”

Given that formative assessment in the classroom setting has been shown to improve learning outcomes, we were interested in whether formative assessment in the informal setting of the planetarium might similarly improve learning outcomes.

We designed this study to measure the amount of interaction between planetarium educators and the visitors who participated in live planetarium Carolina Skies presentations (often dubbed “constellation shows” or “skywatching shows”), the premise being that higher interactivity equates to more formative assessment.

If interactions during a 45-minute planetarium program were intended as parts of a larger conversation focusing visitors on learning the night sky, then those interactions fall into what Dochy & McDowell (1997) describe as being formative assessment: “Where it is associated with a dialogue between learner and teacher, the initial reliability of the assessment need not be high; what matters is that a basis is laid for a conversation.” We aimed to measure the quantity of formative assessment and how variations in that quantity were associated with participants’ learning outcomes.

Per Dodge (2009), formative assessment includes activities such as written assessments, oral assessments, and teamwork activities. The type of formative assessment most common in a live planetarium presentation is oral assessment, sometimes referred to in a classroom setting as recitation.

While we can envision participants in a planetarium presentation working together, writing responses on index cards, sorting information graphically, or many of the other superb classroom-based formative assessment activities, we feel that many of these would either have to be modified substantially and others abandoned for fear of violating participants’ expectations or because of constraints inherent in our environment.
Oral assessment, particularly interactions between presenter and participants, leaps to the fore as the most obvious, most easily measured, and possibly most interesting type of formative assessment to explore.

**Methods**

Over the course of 10 planetarium presentations given by five experienced educators from October to December of 2009, we used an audio-recording device to capture all interactions between the educators and their audiences. We collected information about the demographics and characteristics of the subset of audience members who agreed to participate in the study, and we measured learning outcomes by administering a post-presentation assessment with six questions.

Data Collection Tool 1 shows the questions we asked to measure participants’ characteristics.

How can you capture formative assessment in a dark room? Because formative assessment often takes the form of dialogue between students and teachers, we used measures of oral interactions between presenters and audience members as a surrogate for formative assessment. We recorded and transcribed the audio of 10 presentations and counted the number of “verbal handoffs” in each. We assumed that the more oral interactions that occur, the more formative assessment can, and likely does, take place.

A verbal handoff was counted in two ways: Type 1 handoff: Any moment when a new voice was heard in the conversation in place of the immediately preceding voice, and Type 2 handoff: Any moment when the presenter asked a question with clear intent to get participant response (that is, not merely a rhetorical question).

In Table 1, a sample of verbal handoff dialogue captured during one presentation demonstrates both types of verbal handoffs.

We defined the number of interactions per hour as being the “interactivity” during each presentation. We considered how each presentation’s interactivity was associated with average learning outcomes among all participants in that presentation.

To capture information about the takeaway knowledge and skills of our participants in each presentation, we asked participants to complete the following form immediately afterward.

**Results**

Out of 328 presentation attendees, 110 participated in the demographics and baseline characteristics collection portion of the study. We removed from the analyses the 20 participants who did not complete the post-presentation assessment, leaving 90 participants.

The 90 participants had the following distributions by gender, age, highest grade completed, and reasons for attending as shown in Figures 1-4.

Table 2 shows the interactivity for each presentation. Presenters tended to keep similar interactivity from presentation to presentation. Presenters 3 and 5 gave only one presentation each, while Presenter 1 gave four.

Table 3 shows that Question 2 (identifying a particular planet) garnered the lowest number of correct answers: 75. It also reveals that Question 4 (identifying a particular constellation) garnered the highest number of correct answers: 87.

To determine the relationship between interactivity and learning outcomes, we compared participants’ average scores at each presentation, shown in Figure 5: Average Score vs Interactivity.

**Discussion**

In this study, high interactivity and low interactivity were associated with better learning outcomes than was medium interactivity (see Figure 5), whereas we had expected that interactivity would be associated with learning outcomes in a dose-response manner.

One possible interpretation of the results is that a medium level of interactivity facilitates
Data Collection Tool 2: Final Assessment

1) The laser pointer is indicating a cardinal direction. Which direction is it?
2) The laser pointer is indicating a local object in the sky. It is:
3) Why is the North Star always in one spot in the sky?
   a. It orbits Earth in a synchronized fashion.
   b. The Earth’s north pole points at it.
   c. It is the brightest star in the night sky.
   d. It is closer to Earth than any other star.
   e. Not sure
4) The laser pointer is now pointing to the major stars in a constellation. Which constellation is it?
5) The Moon’s phase currently is
6) The laser pointer is now indicating a bright star. The name of that star is:
   a. Aldebaran  b. Betelgeuse  c. Polaris, the North Star  d. Vega  e. Not sure

Table 1: Examples of Interactions

<table>
<thead>
<tr>
<th>Audience Member: Where is the Big Dipper?</th>
<th>Presenter: Where is the Big Dipper? Anybody have an idea of where we would look for the Big Dipper out here? (pauses, waits)</th>
<th>Audience Member: (No response)</th>
<th>Presenter: Okay, I will give you a hint. The Big Dipper is really hard to find right now...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1 Verbal Handoff</td>
<td>Type 1 Verbal Handoff</td>
<td>Type 2 Verbal Handoff</td>
<td>Type 2 Verbal Handoff</td>
</tr>
</tbody>
</table>

Table 2: Interactivity by Presentation

<table>
<thead>
<tr>
<th>Presenter</th>
<th>Presentation Date</th>
<th>Interactivity (Interactions/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presenter 1</td>
<td>Oct 10, 2009</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Oct 17, 2009</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>Oct 24, 2009</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>Nov 7, 2009</td>
<td>92</td>
</tr>
<tr>
<td>Presenter 2</td>
<td>Nov 14, 2009</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Dec 4, 2009</td>
<td>21</td>
</tr>
<tr>
<td>Presenter 3</td>
<td>Dec 11, 2009</td>
<td>56</td>
</tr>
<tr>
<td>Presenter 4</td>
<td>Dec 12, 2009</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Dec 18, 2009</td>
<td>32</td>
</tr>
<tr>
<td>Presenter 5</td>
<td>Dec 19, 2009</td>
<td>62</td>
</tr>
</tbody>
</table>

(Continues on Page 32)
FROM THE MAKERS OF “ASTRONAUT” & “WE ARE ASTRONOMERS”

ARE WE ALONE?
NEW 360° FULLDOME 2D & 3D DIGITAL PLANETARIUM FILM
CHECK OUT THE FULL-LENGTH PREVIEW: WWW.WEAREALIENS.COM/PREVIEW
Table 3 – Participant Scores on Assessment Questions by Presentation

<table>
<thead>
<tr>
<th>Presentation Date</th>
<th>Number of Participants</th>
<th>Number of Participants with correct answers to:</th>
<th>Average score (out of 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Question 1 Cardinal Direction</td>
<td>Question 2 Planet Indicated</td>
</tr>
<tr>
<td>Oct 10, 2009</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Oct 17, 2009</td>
<td>8</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Oct 24, 2009</td>
<td>12</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Nov 7, 2009</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Nov 14, 2009</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Dec 4, 2009</td>
<td>10</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Dec 11, 2009</td>
<td>14</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Dec 12, 2009</td>
<td>10</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Dec 18, 2009</td>
<td>5</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Dec 19, 2009</td>
<td>17</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Across All 90 Participants</td>
<td>85</td>
<td>68</td>
<td>75</td>
</tr>
</tbody>
</table>

Interactivity, continued from page 30

tion, possibly across multiple planetariums, could help make such a determination.

Acknowledgments

We wish to acknowledge the presenters at Morehead Planetarium and Science Center (University of North Carolina at Chapel Hill) who devoted their time to this research. We also wish to thank the leaders at Morehead Planetarium and Science Center who made equipment and facilities available and assisted with the initial design of the graduate research upon which this article is based, including: Denise Young, Richard McColman, Elysa Corin, Mickey Jo Sorrell, Gabrielle Scronce, and Todd Boyette.

References


(Continues on Page 40)
Who was Armand Spitz?

Father, husband, educator, innovator

Early Life with Armand Spitz:
A Summer Planetarium History Adventure
Verne Spitz Rice, California
Joyce Towne, Spitz, Inc.
Chadds Ford, Pennsylvania
Verne: That’s how I began a message I sent to various friends and relations in May, shortly after I made up my mind to accept Joyce Towne’s invitation to go east in July and talk about my father, Armand Spitz. A chance to describe him, as seen through my childhood eyes, to tell some stories and to set some records straight. What a lark!

Spitz Inc. would be participating in the Middle Atlantic Planetarium Society meeting in Maryland, and later would be holding the annual Summer Institute in Chadds Ford, Pennsylvania. Joyce thought attendees at both events might enjoy hearing what it was like to live with a father whose greatest love was the sky, and the stars and outer space. Having inherited some of his corny sense of humor, it had struck me that, as transplanted Pennsylvanians, going east from California was tantamount to visiting from Outer Space.

JT: “We’ll hear about the man Armand Spitz was before he became a planetarium innovator and our company founder,” I explained to my boss. It would be an opportunity for us to meet and host Verne (Spitz) Rice, one of the only people on the planet who can share accurate stories and information about Armand. At 77, Verne doesn’t travel out of California very often, so no time like the present.

She warned me she knew nothing about star projector design, the current state of planetariums, or the business side of her father’s years founding Spitz Laboratories, way back in the 1940s and 50s.

Her first stop, the day after she flew east, was our manufacturing facility in Chadds Ford, penning a message to various friends and relations about her visit to our company and discussing her plans to visit the Middle Atlantic Planetarium Society meeting in Maryland.

Prepare for Visitors from Outer Space.
which she was about to see for the first time.

**Verne:** I had to admit, right off the bat, the only reason I recognized the soft soap can, my father’s prototype instrument, in the lobby display was that I’d heard about it so much. But first-hand memory of it? Not a chance. One of the neatest benefits of this personal adventure in time travel—going backwards—was that it brought back memories I’d previously been unaware of.

I certainly remembered what A-1 looked like—but meeting one face-to-face after so many years was a real kick. As a card-carrying adult, I went back to school and became a psychotherapist. I can attest to the fact that even gathering photos and data about Armand for the talk was a flabbergasting joy: it far surpassed therapy (and it was cheaper, too).

**JT:** We gave Verne a whirlwind tour of the plant, and she met our staff, including several people who’d been at Spitz since its very early days (then called Spitz Laboratories).

Later, she talked at an informal luncheon. It was a fascinating collection of stories and images I hadn’t seen before, including one photo taken at Princeton, of Armand posing with winners of the Franklin Institute Science Fair, which he’d organized. Standing front and center with them was none other than Albert Einstein.

**Dodecahedron memories**

**Verne:** First of all, I was sort of stunned when Joyce said that I was on the schedule for a lunch talk for Spitz staff. If I’d known ahead, I’d have had very cold feet, but it was a true blessing in disguise. My only rehearsals had been on home turf with a few close (and predictably forgiving) friends. In Chadds Ford it took only a few minutes to fall in love with the Spitz people, whose attentiveness, questions and laughter were warm enough that cold feet weren’t a problem.

I shared with them the fact that not until I prepared my talk did I learn that (allegedly) Armand had consulted with Dr. Einstein about the best way to create a near-sphere through which to project the stars in an undistorted image. The solution: a dodecahedron, created at first from twelve plastic pentagons (later brass) which became the basic structure of the first A-1 Spitz planetarium and a subsequent model.

**JT:** Later we drove to Columbia, Maryland, near where the Middle Atlantic Planetarium Society was to meet at the beautiful Robinson Nature Center. Spitz Inc. had helped design the NatureSphere. The theater, and the SciDome planetarium, are key parts of the Nature Center, offering a roster of demonstrations, classes and shows about astronomy, birds, bugs, bats and more.

**Verne:** (Speaking of insects: right after Joyce met me at the airport, she’d mentioned fireflies. I hadn’t seen one in 44 years. She arranged a special al fresco display for me shortly thereafter.)

The only problem with our day at the Nature Center was not enough time to tour it. I got my first chance to see a digital planetarium in action—many generations younger and incredibly evolved from the ones I grew up with. Could this black box, about the size of a hotel-room refrigerator, really be a planetarium?

**The soap can projector grows up**

I knew Armand would have been delighted to see how remarkably his original soap-can vision of a projector had matured. I think he’d have been thrilled to see the way his passion for teaching astronomy had “exploded” into a medium for teaching about a universe of new areas of science.

I can’t begin to describe what it was like for me to give the talk that afternoon. My audience was 50 or 60 “stars,” mostly planetarium professionals; bright, shining and responsive. I opened with “my father’s whole world revolved around science, even to the point of naming his daughter after a certain well-known 19th century science fiction writer.” They got it (and my ego puffed up a bit in magnitude.)

I told stories of Armand’s pre-planetarium (sometimes a bit peculiar) projects and minilectures, all preludes to the contributions he later made. One story went that when he and my mother, Vera, were courting, she had wondered aloud about the name of a particularly bright star. He said he didn’t know, but he’d find out.

Hence began his first explorations into stars and planets and galaxies; he’d never had any formal training whatsoever in astronomy. Not had he studied meteorology, nor physics, nor music, but there was something of the fundamental teacher in him.

Even more fundamental was that he was an ardent collector of the famous “one-man’s trash” which becomes another man’s treasure. I described the ancient, mostly bro-
ken-stringed zither he acquired, heavily laden with dust. It was too tired and warped to make music, but he could (and did) demonstrate that the more tightly he wound the metal strings (until they broke) the higher the tone was emitted when plucked.

A wheezing treasure

It got worse, I said, when he brought home a fairly large, very ill, pipe organ. Mind you, this to a fairly small house. This treasure, too, did not make music; it wheezed. Childhood friends took great pleasure in creating haunted-house sounds by treading vigorously on its worn-down pedals. And the harder they pedaled, the higher the wheezy notes became—illustrating something about how wind instruments worked.

He hadn’t studied psychology either, but he developed what I called a very effective behavioral intervention. When I was young, maybe five or six, I was scared of lightning and thunder. He taught me that when I saw lightning I was to begin counting “this second is one, this second is two”, and clap my hands as hard as I could, and yell “NATURAL PHENOMENON” as loudly as I could. His theory was that I’d drown out the thunder, thereby taking control of the situation, so I had nothing to fear.

I couldn’t have been more pleased at the audience’s response. Several people remembered Armand’s early work or had known him personally. I’d have loved to spend hours with them—they had rich and fascinating tales to tell me. And we had some handouts for them—one was an article that had appeared in the Franklin Institute News (December 1943), which I thought so brilliantly described him that I ended my talk by quoting it. (Copies were available on request. Hint: there’s a pretty neat story about the genesis of this article as well.)

But the MAPS schedule had plenty of great sessions yet to come that afternoon—and I had a ride to Virginia, to embark on my next step as a Visitor from Outer Space. Several old friends from the DC area had come to Maryland, and in the 10-day interlude between MAPS and the Spitz Summer Institute, my daughter, Abigail, and I planned to visit my old friends from the DC area. We needed to see it because it was the site where our hosts thought might have been Armand’s office. It was flush up against the outside of the planetarium dome. During my high school years, I’d walk to the Institute and do my homework while waiting for a ride home.

On a brighter note, the visit with our Virginia friends brought the second run of the Firefly Show Joyce had reminded me about and took me to, right after I arrived. I'd remembered fireflies fondly within minutes of first meeting her face-to-face. Fireflies, by the way, may not be quite as stellar as stars are, but they have the good wisdom not to colonize in California, where all is neon and synthesized!

Later on in our travels, I also spent time with new friends who were inextricably linked to Armand, his work and his many and varied passions. A bit of romantic history: In his later life, my father married Grace Scholz, an acquaintance of many years who had been a pillar, and at one time president, of the Astronomical League, the largest and most influential of several groups of amateur astronomers. After Armand was appointed as a special consultant to the National Science Foundation and director of Project Moonwatch’s visual satellite tracking activities, he and Grace recruited the lions’ share of the amateur astronomers who constituted the national and international tracking teams.

Grace had a good friend, Mabel Smith, a colleague from her years at the Department of Health, Education and Welfare. I saw her while I was in DC. She has a remarkable memory for interesting Grace-and-Armand stories. During my father’s long illness, she and her daughter Lisa Roney’s family spent many Sundays visiting and engaging Armand in long conversations, mostly about astronomy. This caring contact helped keep his never-disabled mind alert and enthusiastic. Lisa’s husband, Milt Roney, teaches astronomy to seniors (through the Osher Lifelong Learning Institute) at Rock Creek Park Planetarium.

Back to the Franklin

We moved on to Philadelphia, and a highlight of our Armand Tour was going back to the Franklin Institute, where I’d spent many hours of my childhood. As a former journalist, my father had been a writer and publicist; he later became Director of Education and a lecturer at the Fels Planetarium.

JT: Back in the 1930s and ‘40s, all planetarium shows were live, and the Franklin Institute had a strict policy that only degreed astronomers could present Fels Planetarium lectures. Armand knew he had what it took to enthral an audience, and he worked diligently to practice, demonstrate, and finally get the policy waived in order to add planetarium lecturing to his repertoire.

Verne: The most interesting part of our Franklin Institute tour was seeing the room that our hosts thought might have been Armand’s office. It was flush up against the outside of the planetarium dome. During my high school years, I’d walk to the Institute and do my homework while waiting for a ride home. Often classmates came with me to do algebra.

When the show of the month was “A Trip to the Moon,” a door from the corridor outside the office would open. Quietly, a spacecraft clad in a uniform, remarkably out of the 60s and 70s, which were still a couple of decades in the future) would stride across the office. He’d open another door to a platform backlit so it showed through the dome, and demonstrate how to steer his craft directly moonward. My classmates were duly impressed, and I was certainly the only student at school who could offer them this particular after-school treat.

JT: That early planetarium show is legendary; I had heard about it when I worked at Fels. The rudimentary special effect was very dramatic. If you illuminate the area behind the Fels dome, you can still see the door with the circular airlock handle “handle”, about half way up to the zenith, leading from the rear work room (floor 2.5) to the catwalk behind the dome.

Verne: On another day, we visited our Old House, where Armand fielded Vera’s question about the name of the star she saw. Then deep in the countryside and in primitive and shabby condition, it has been restored and is now called the Thomas Massey House, headquarters of the Delaware County Historical Society. We needed to see it because it was the site...
by the fertile ground on which the House was built—and the absence of lights and smog—grew into being a fledgling astronomer, teacher and planetarium innovator.

About building a 5-foot model of the moon, with realistic craters right where they belonged, my mother Vera wrote:

“There is something to be said for a man who can make messes in the kitchen boiling cream of wheat in order to watch it bubble and break so that he can get a line on crater formation.”

About building his first telescope:

“Taking down the stoves (the first part of the house was built in 1696) had given him an idea and, inspired by the lovely contours of a piece of stovepipe, he had started to build a telescope…. He used bits of this and that and the flat top of the big round stove was turned into a grindstone. On it he ground the mirror, which took 40 hours devotion and much perspiration, and after many weekends he had assembled the telescope, and it worked.”

When we left the Old House, I thought of how it linked to the reason for our making this trip in the first place: to talk about Armand-before-the-planetarium. The words that came to mind were: It all started here.

The Visitors from Outer Space spent another week or so exploring Philadelphia, catching up with old friends, visiting my Penn roommate (Armand had gone there too), admiring and coveting east coast architecture and wonderful and affordable places to live. Perennial Foodies, we reveled in scrapple, hoagies, and Bassetts ice cream, Armand’s lifelong favorite.

We are theatre lovers. (My father, who had gone there too), admiringly people I’d never met, who’d come to learn how to teach with digital planetariums—was part of my family.

They were there to honor Armand, to hear about how he came to make the contributions he had, and to be as awed as I am about what’s happening now and about the future Spitz promises to the world of astronomy education.

I told them I thought that they—astronomers, planetarians, educators, museum staffs, those who were at the Summer Institute, even people who just love to look into the sky—all were Armand’s legacy.

What he wanted most to do was to make the beauty, as well as the science, of the stars, the planets, the galaxies and the universe available to the eyes and hearts of all.

And in my audience were the people who would carry this legacy to the world.

**JT**: A recording of one of Verne’s summer presentations, “Growing Up With Armand Spitz” can be viewed at [www.youtube.com/watch?v=6vVABX8ruU](http://www.youtube.com/watch?v=6vVABX8ruU) and includes many more stories.

Verne can be emailed at evrice@pacbell.net and is interested to hear from the planetarium community (especially if you have Armand stories to share).

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**Moon Phases, continued from page 26**

filled to become a full moon. The influence of language is evident: the word “full” suggested to Benoît that the moon was like a vase that could be filled up. But clearly he also assimilated the fact that the moon changes appearance in a regular and predictable fashion, even though the sequence of the phases and the causes behind them were still misunderstood.

At the end of the session and in the post-test, Benoît was finally able to explain the lunar phase process by using the scientific model. As Benoît said himself, seeing the spherical moon revolve around Earth in space helped him discard his mistaken notion and adopt the scientific explanation.

At the start of the session, 12-year-old Bernard could already adequately explain how the lunar phases occur. He was among the first to place the photos of the phases in the right order and had no trouble demonstrating the motions of Earth and the moon around the sun.

After the session, he had a stronger understanding and knew the right names for all the lunar phases, including the gibbous phases, which had caused some problem for participants.

But his most remarkable comment occurred during the post-session discussion: when I asked students for ways to improve the dome theatre session, Bernard suggested we visit Jupiter to see the phases of its main satellites. Without any prompting, he spontaneously transferred what he had learned about lunar phases to the situation of another planet circled by satellites. Such a transfer is extraordinary and, in our opinion, directly related to the better visualization provided by a digital planetarium.

These two examples are very encouraging, as are my other findings (which I do not have space for here). What will the next steps be? Note that this work is part of a longer research project founded on the methodological approach of design-based research—in other words, a series of iterations whereby a teaching session is tested, revised in light of its initial results, and then retested until it achieves its theoretical and pedagogical goals.

With the opening in April 2013 of the Rio Tinto Alcan Planetarium and its two 18-m digital theatres, I will be able to continue my research and adapt the teaching session to environments that can accommodate a larger number of students.

The lessons I learn will help me refine my lunar phase session and also develop similar approaches to explore the cycle of the seasons, eclipses (closely related to the phases of the moon) and many other astronomical phenomena with a strong spatial component.

The digital planetarium will certainly become the best tool for teaching common and often difficult astronomical concepts to the larger number of students—teachers—visiting our institutions.

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**Verne during her talk for the MAPS conference. Photo by Scott Huggins, used with permission.**
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IPS Council meeting minutes, continued from page 40

How do we generate more opportunities around the world?

How do we expand international collaborations?

How do we get greater recognition for efforts that all of us do to increase interest in STEM?

IPS Vision 2020 would allow us to provide opportunities that will (a) involve younger members in IPS, (b) review our mission, by-laws, and procedures, and (c) update and revise those areas as appropriate in a coherent manner. If this is done well, it will lead to growth in IPS around the world. The officers have been discussing a timeline, strategies, methods to engage affiliates in the planning as a team, and a budget to support the effort. A proposal outlining the details, timeline, and specific objectives will be submitted to Council for review and comment.

Project Reports—none For the Good of the Order

Jeanne Bishop, on behalf of Council, thanked President Thomas Kraupe for the arrangements for the Council Meeting.

With business completed, Shawn Laatsch moved to adjourn the meeting, seconded by John Hare, and approved by Council.

Respectfully submitted,

Lee Ann A. Hennig
Executive Secretary, IPS
August 10, 2013

Addendum to the Minutes:

October 1, 2013 Rocky Mountain Planetarium Association (RMPA) submitted an annual report.

October 22, 2013 Pacific Planetarium Association (PPA) submitted an annual report.

on.fb.me/PlanetariumTweets

MISSION REPORTS

• My mom wants to take us to the planetarium and she knows I hate them
• the planetarium was awesome!! satisfied my love of stars and astrology! :D

• My mums ring reflected light onto the ceiling so she yells “we have our own planetarium, we are rich!” If only it was that easy mum
• today I saw a toilet that played music and a planetarium in a bedroom.. I wish I could live this life #sweetlife
• The real stars are so much better than my fake planetarium stars, guys.
Nightshade NG

The Next Generation open simulator for educators.

Nightshade NG is free, open source simulation and visualization software for teaching and exploring astronomy, Earth science, and related topics.

Ten years in the making, Digitalis is finishing up a complete rewrite of Nightshade. Expect the same great usability, realism, stability, and performance that Digitalis is known for. Our feature set will include capabilities previously only available in expensive proprietary software.

We threw out the stifling limitations of our legacy code inherited from Stellarium so that we could add new features like the freedom to leave the solar system and support for massive astronomical and terrain databases. Upcoming features include volumetric nebulae and galaxies, SDSS data, and much more. Preview releases are now available.

For dome use, Nightshade NG will be exclusive to Digitarium® digital planetarium systems.

Learn more and download preview releases at NightshadeSoftware.org
Love, lust and severed heads: It must be Greek mythology

Monsters in the family tree

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Most people appreciate the beauty and mystery of the night sky. They know some of the patterns of stars in the sky and they might even know they are connected to a story. Many of these stories are associated with Greek myths.

I feel the richness of these myths because I grew up in Greece. Not only do I know how to spell and pronounce the characters’ names, but, more importantly, I have a sense of the depth of these stories. I have some context: I have smelled the thyme, gazed at the olive groves, felt the heat, tasted the salt of the Mediterranean, and admired the Parthenon.

Although I am not a scholar specializing in mythology, I have always been fascinated with these myths and have researched them both in Greek and English sources. I hope that what follows will help you appreciate the texture of the myths associated with fall and winter constellations and many famous monsters too.

Perseus’ family history

A long, long time ago, King Acrisius1 of Argos and Queen Eurydice2 had a baby girl, Danaë.3 Argos was a powerful kingdom in the Peloponnesse thanks to its deposits of silver and its fertile soil, which to this day yields superb citrus fruit.

Many years went by and the King hadn’t sired a son. What good was all the wealth and power to the King when he had no male heir, no successor? In despair, he decided to seek advice from the oracle. He was told, “Alas, poor King, not only will you not sire any male children, but your one and only daughter will give birth to a boy who will kill you.”

Panic struck the King. The King decided that he would prevent his beautiful daughter from bringing any children into the world by locking her up in a dungeon.

Danaë’s extraordinary beauty did not escape the attention of Zeus, the king of the gods with the roving eye. No prison walls could dissuade him. In this case, Zeus became a shower of gold, his most ingenuous transformation of all, to be able to enter Danaë’s prison and woo her. Nine months later she delivered a baby boy, Perseus.

King Acrisius was angry that Danaë had a baby despite all his precautions. Obviously he couldn’t simply dispose of Zeus’s son without bringing upon himself the thunderbolt of the mighty god. So the King had to think of a more subtle way to get rid of his daughter and her child: he put them in a wooden ark and set them adrift at sea in the hope that they would perish. And yet they survived.

The mother and babe were washed ashore on the island of Seriphos,4 where a fisherman named Dictys5 found them and took care of them. When the mother and child were stronger, Dictys presented them to the king of Seriphos, Polydectes, who was impressed by Danaë’s beauty and courage. As Danaë spent more time in court, the King resolved to make her his queen. She, however, did not respond to his advances.

Eventually, King Polydectes changed tactics. He stopped pestering her, and made it known that he had lost interest in the lovely Danaë. He invited all his friends to a royal feast, pretending that he was going to ask for Hippodameia’s hand in marriage, and suggested to his friends that they contribute a horse each toward a present for the bride’s family.

Perseus, with the boldness of youth, assured the whole party that he would set out at once to kill Medusa and that he would not return until he had accomplished his task. The goddess of wisdom, Athena, who always showed a soft spot for spirited brave men, realized that Perseus was headed toward certain death unless she intervened. She showed him images of Medusa and her two immortal siblings, Steno and Euryale. Now that Perseus knew what Medusa looked like, he could learn her story.

Medusa and her family tree

Medusa was one of the three Gorgons who lived by the Ocean at the edge of the World. All of the Gorgons had great black wings, scaly bodies, fingers ending in talons, and two great fangs. But what made them truly hideous was that their hair was made of living venomous snakes. One look at Medusa’s face was sufficient to turn you into stone.

1 Also spelt Acrisius, which is closer to the Greek.
2 Some sources have Aganippe as Acrisius’ wife.
3 Also spelt Danaë.
4 Also spelt Serifos: a barren island in the western Cyclades of the Aegean sea.
5 Dictys is sometimes referred to as being the brother of King Polydectes, but it seems odd that a humble fisherman would be the King’s brother.

Perseus was so relieved that his mother would finally be left in peace that he declared: “Unfortunately, I cannot afford to give you a horse; but I am so pleased that you don’t wish to marry my mother that I could bring you the head of Medusa if you so desire.” This expression was a common saying at the time to indicate that a person would do something impossible such as “I will move Heaven and Earth.”

King Polydectes saw his opportunity. He told Perseus that the head of Medusa would be greatly appreciated, but he didn’t think that the young man could accomplish such a feat. Perseus, with the boldness of youth, assured the whole party that he would set out at once to kill Medusa and that he would not return until he had accomplished his task.

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6 Interestingly, there is no consensus on why Medusa was so ugly. In the earlier myths she is described as a woman who was born ugly, but later versions of her story portray her as a woman who was born beautiful but was turned into a hideous monster as a punishment by the goddess Athena for bedding Poseidon in Athena’s temple.
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Perhaps it is no wonder she was a monster: she was one of the children of Phorcys and Ceto, whose other offspring included Ladon (the dragon that guarded the golden apples) and the Graeae, who were three old crones who shared one eye and one tooth, which all three used in turn.

**Perseus hunts Medusa**

With this information, Athena hoped to impress upon Perseus the difficulty of his mission to kill Medusa. She explained that he could not possibly achieve his goal unless he was well equipped. To start with, she gave him her shiny shield to protect himself by locating Medusa by her reflection. Hermes, the messenger of the gods, also gave Perseus a diamond sickle with which Perseus could cut off the Gorgon’s head.

The goddess told Perseus that in addition to her shield and Hermes’ sickle, he would need three magical items from the Stygian nymphs in the land of the Hesperides: winged sandals that would allow Perseus to escape with haste if he needed to, the invisibility helmet of Pluto to hide from foes, and a magical sack that could expand to hold the Gorgon’s head.

Too bad that nobody knew where the Land of the Hesperides was, except the Graeae, the sisters of the Gorgons.

Perseus rushed to the base of the Atlas Mountains in North Africa to ask the Graeae where he could find the Land of the Hesperides. The Graeae weren’t interested in divulging this information because they knew that Perseus had as his mission to kill their sister, Medusa.

Perseus realized that he would need to extract this intelligence forcefully. He waited until the Graeae were most vulnerable: he grabbed their one eye when they were passing it from one to the next sister. They pleaded with him to give them back their one and only eye, but he categorically refused until they disclosed the location of the Hesperides.

He then flew to the land of the Hesperides and secured the three additional magical items that he needed to succeed in his quest for Medusa’s head.

Perseus, now well equipped, was able to fly into the cave in which the Gorgons lived and waited, out of sight, for them to fall asleep. He carefully used his shield to see only the reflection of Medusa. Athena guided his hand to cut off Medusa’s head and put it carefully in the sack.

To Perseus’ surprise, from the body of Medusa two creatures emerged: the winged horse Pegasus (a famous fall constellation) and the Graeae two creatures emerged: the winged horse Pegasus (a famous fall constellation) and the giant Chrysaor, who had an interesting family tree of his own. With all the commotion, the other Gorgons found their sister decapitated and sought revenge, but since Perseus was invisible, he was able to escape from the cave unharmed.

A small aside about Chrysaor: Chrysaor had a son named Geryon, who was the strongest man alive with three bodies joined at the waist, and a daughter Echidna, who was half woman and half snake. Echidna mated with Typhon, who was the scariest of all the Titans; he was the only Titan feared by even Zeus.

This pair of awful creatures produced some of the most famous Greek monsters of all:

- Cerberus: the three-headed dog that guarded the entrance to the underworld (note that the less common spelling Kerberos is used for the newly-named moon of Pluto because Cerberus had been used for an asteroid already).
- The Nemean Lion: the tricky lion whose skin could not be penetrated by any implement; to kill this lion, Hercules had to strangle it with his bare hands. To honor the brave creature, Zeus put him in the sky as Leo.
- Orthrus: the two-headed dog that guarded Geryon’s cattle that Hercules had to kill.
- Chimaera: the fire-breathing female monster with the front of a lion, a serpent’s tail and a goat in between, who was eventually killed by the hero Bellerophon riding Pegasus.
- The Sphinx, which in the Greek tradition had a woman’s head, a lion’s body, an eagle’s wings, and a serpent’s tail. She also had an appendix.

**Perseus and Atlas**

As Perseus flew over North Africa on his way home, he saw Atlas, the famous Titan who bore the sky on his shoulders. Perseus had to approach the Titan to admire him up close, but also to brag to Atlas that he (Perseus) had just killed Medusa.

Atlas thought this story was just a tall tale and didn’t believe that a mere mortal could achieve such a feat. To show his worth, Perseus revealed that he was the son of Zeus and named Atlas in a way home, he saw Atlas, the famous Titan who bore the sky on his shoulders. Perseus had to approach the Titan to admire him up close, but also to brag to Atlas that he (Perseus) had just killed Medusa.

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Perseus Cycle 7: The Doom Fulfilled, 1888, Edward Burne-Jones. Original at Staatsgalerie Stuttgart (State Gallery) in Stuttgart, Germany. Photograph of original artwork; Wikimedia Commons

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7 Also spelt Orthros and Orthos or Orthus.
8 Also Chimaera or Chamaira.
9 In some sources, she is the granddaughter of Echidna and Typhon, the daughter of Orthrus and Chimaera.
10 Audiences who are familiar with the Percy Jackson series have seen that Medusa turns people into stone with her eyes. I am convinced this was done for cinematic purposes and is not consistent with any of the sources I looked at.
Medusa, continued from page 47

myth explains the presence of snakes there.

As he continued his trip, he noticed that a young woman tied to a rock was being attacked by a vicious sea monster; to Perseus’ horror, it looked like the creature was going to devour the lovely maiden. Why would such a lovely woman be sacrificed to a monster? Here is her story.

Andromeda’s predicament

Andromeda, the young woman who Perseus saw, was the daughter of the Ethiopian King Cepheus of Joppa11 and Queen Cassiopeia. Queen Cassiopeia was strikingly beautiful and she knew it. Unfortunately, the vain woman claimed that she was more beautiful than the water nymphs called Nereids.

These goddesses were so insulted that they demanded that Poseidon, the ruler of the sea, plague the kingdom of Ethiopia with the meanest monster he commanded. Poseidon chose Cetus (Ketos in ancient Greek means a very large sea creature, like a whale). This monster would attack fishermen at sea and bathers by the shore more and more boldly.

Eventually, the Ethiopians complained to their king and queen and demanded that something be done about the monster. The royal couple sought the advice of the oracle, as Perseus’ grandfather had done. Whereas sometimes the advice was a bit nebulous, in this case it was very clear: the queen had insulted the daughters of the Ocean and for this her punishment was severe: she would have to sacrifice her one and only daughter, Andromeda, to Cetus.

Obviously, the king and queen were not at all interested in sacrificing their only child, so they tried to find ways around this prophecy, but in the end it couldn’t be helped. Andromeda was tied to a large rock and was prepared to give her life to save her people.

This was the scene that Perseus witnessed and came to her rescue. He offered to save her from the monster if her parents agreed to let him marry her; her parents agreed.

He flew by the beast and with his trusty diamond sword he was able to kill Cetus and rescue the princess. He proved his worth and she was eager to marry him. This development did not please Queen Cassiopeia, because she had promised young Andromeda to the king’s brother, Phineas,12 who wasn’t willing to be shortchanged since he had a prior claim on the lovely’s princess hand.

So after saving Princess Andromeda from certain death, Cassiopeia encouraged her brother-in-law to have Perseus killed so they could proceed according to their original plan. Phineas and his companions ambushed Perseus, who was so outnumbered that he decided to use the head of Medusa to petrify his opponents.

Perseus returns triumphant

The hero was now free to take his wife Andromeda from Ethiopia and head back home to give her life to save her people.

Medusa by Caravaggio, located in the Uffizi Gallery in Florence. Photo of original, Wikimedia Commons.

to bring the head of Medusa to King Polydeuces. When Perseus arrived in Seriphos, he discovered his mother and Dictys hiding in a temple to avoid being harassed by the king.

Annoyed, Perseus visited the palace to announce that he had accomplished the task he promised to do. But this announcement was not met with astonishment and admiration: it was met with ridicule. King Polydeuces and his court did not believe for a minute that Perseus had successfully beheaded Medusa. Their taunting forced Perseus to take the head out of his magical sack to show them, which of course turned all the men of the court to stone, including the king. Danaë, Perseus’ mother, was free at last.

Perseus’ fate

Now that Perseus’ mission was accomplished, he returned the magical items to their owners. But what was he to do with the head of Medusa? Perseus gave it as a gift to Athena, who placed it on her shield.13

Everything was settled except his grandfather’s fate. Perseus traveled to Argos to assure King Acrisius of his best intentions toward his grandfather. But when Acrisius heard that Perseus was coming to Argos, frightened that the prophecy would come true, the King fled Argos and went to Larissa.14 His grandson followed him to Larissa, where he tried to convince the King that he meant no harm to him. While they were in Larissa, Perseus was invited to participate in some games. When he threw the discus, the wind pushed it off course and, by the will of the Gods, the discus hit Acrisius’ foot and killed him. Perseus was so heartbroken that he did not accept his grandfather’s throne of Argos and decided to trade kingdoms with Megapentes. Megapentes became the King of Argos and Perseus the King of Tiryns. Over time, Perseus enlarged his kingdom, built Mycenae, and lived happily ever after with Andromeda. This romance is one of the few in Greek mythology that did not end in tragedy for its protagonists.

One of their sons, Electryon, the King of Mycenae, married Anaxo, a union that produced Alcmene, who would be the mother of the greatest hero of all: Hercules.

Sources


Kakrides, I. Th. et al. (1986). Greek Mythology: Athens: Ekdotiki Athenon (in Greek). This work is huge five tomes of Greek mythology with different versions of the myths and detailed references from original sources.

www.theoi.com Although not as authoritative as the previous sources, this website does have a lot of detailed information on Greek myths.

11 The term Ethiopia in ancient Greece did not designate the same region as modern day Ethiopia in East Africa. Joppa (now Tel Aviv) is in Israel.

12 Also found as Agenor.

13 In fact, the head of Medusa, the Gorgoneion, was a very common motif on pots, temples, and other items of every day life. Scholars wonder whether the motif was developed long before the myth was established. By the beginning of the 6th century B.C.E., the story of Medusa appeared all through the Greek world, but the motif is much older.

14 Larissa is located in the Greek region of Thessaly, due north of Argos.
Ignazio Danti: The Man Behind the Planetarium’s name
by Simonetta Ercoli

In Perugia, the planetarium bears of the name of Ignazio Danti, or Egnatio in older Italian, to honour the memory of an important figure in the field of astronomy who was born in our city.

Egnatio was born in Perugia in 1536 and was baptized with the name of Carlo Pellegrino in the Church of San Domenico, one of the oldest and most important churches in the old city. He changed his name to Egnatio on 7th March, 1555 when he entered the Dominican Order to take up the priesthood.

Although he was born into the Rinaldi (or Randali) family, who by tradition were important goldsmiths and architects, Egnatio used his family name only occasionally in print, preferring the pseudonym “Danti,” in deference to Dante Alighieri, author of the renowned Divine Comedy, thereby alluding to the cultural standing of many family members.

As a boy in the family goldsmith’s workshop, his father, Giulio, introduced him to the study of design and measuring instruments, while his grandfather, Pier Vincenzo, taught him to construct mechanical devices. Under his aunt Teodora he studied mathematics, geometry and astronomy.

He spent the years from 1562 to 1575 at the Medici court in Florence, where he taught mathematics and the sciences to Cosimo I’s children and where he also painted 53 maps of the then-known world on the panels of the Guardaroba in Palazzo Vecchio. Fourteen panels show European regions, 11 deal with Africa, 14 depict Asian regions, and another 14, the Americans. Danti painted 35 of them himself and annotated coordinates and reduced scale in each of them.

During this period he built numerous astronomical instruments like astrolabes, globes and anemoscopes, which can be seen today in the Museum of the History of Science (Museo della Storia della Scienza) in Florence.

He lived in the Santa Maria Novella Convent until 1571, where he built a marble sundial and an equinoctial armilla on the church facade.

He also calculated the dates of the equinoxes and the astronomical year with these instruments, during which time he realized that the Julian calendar contained a mistake: the exact date of the equinox was eleven day before the 22nd of March. Thanks to this, he became an important figure in the reform of the Gregorian calendar.

When Cosimo I died, Egnatio had to break off his ambitious project to connect Florence both to the Tyrrhenian Sea and to the Adriatic Sea by means of a complex system of canals, lakes and tunnels through the Apennines because Cosimo I’s son and successor did not support him and asked for him to be transferred.

In 1576 he taught mathematics at the University of Bologna, where he built other anemoscopes and a gnomon at the church of San Petronio. In 1577, having returned to Umbria, he made a series of chorographic and topographic maps of the entire Perugia territory, taking angular measurements with an instrument called radio latino which he had constructed himself.

In 1580 he was called to Rome by Pope Gregory XIII, where he became the Papal cosmographer and mathematician, and where he also worked on the reform of the calendar and planned the decoration of the gallery in the west wing of the Vatican Belvedere, later known as the Map Gallery.

(Continues on Page 58)
Fig. 1
Tracing paths of history

Rudolf Straubel, Walter Bauersfeld, and the projection planetarium

Part 1

As the 100th anniversary (February 24, 1914) of the invention of the concept for the projection planetarium approaches, we take this opportunity to revisit the history of this milestone event, and to explore the leading contributions made to the invention. While the name of Walther Bauersfeld (1879-1959) is widely known in connection with the planetarium’s invention, another lesser-known name is also of significance – that of Rudolf Straubel (1864-1943).

This article will highlight the persona of Rudolf Straubel, his life, and career at Zeiss. Based in large part on documents found in the archives of the Deutsches Museum in Munich and supplemented by published accounts of Franz Fuchs and Bauersfeld, both of whom were participants at the crucial event cited above, it will show in detail the relationships between Zeiss and the museum under Straubel’s leadership at Zeiss, along with Straubel’s personal impact on the development of the projection planetarium.

Using documents from the family archive of Straubel relative Linda Langer Snook, the article will further tell the story of Straubel’s retirement from Zeiss in 1933, his final years, and the fate of his family. Finally, we will explore why his name, his contributions to the development of the planetarium concept, and his fate, have remained largely unknown.

Since the first projection planetarium was built by Zeiss for the Deutsches Museum, in order to better understand the nature of the relationship between these two entities we need to take a short trip back in time to their beginnings, especially of Zeiss.

Beginnings of the Zeiss company

Carl Zeiss and Ernst Abbe: Optical workshop joins with physical sciences

Carl Zeiss founded the Zeiss Optical Co. in Jena, Germany in 1846. The company manufactured microscopes and lenses in an empirical (trial and error) process. Not satisfied with his production methods, in 1866 Carl Zeiss approached Ernst Abbe to join the company as research director.

At the time, Abbe was a lecturer in physics and mathematics at Jena University, where he became a professor in 1870. Abbe succeeded in perfecting a scientific approach for microscope and lens manufacturing, leading to more accurate, predictable and economical products at the Zeiss workshop.

As a reward, in 1876 Zeiss made Abbe a partner in his business. In 1878, Abbe likewise became director of the astronomical and meteorological observatories in Jena.

Finally, in 1879, chemist and glassmaker Otto Schott (1851-1935) joined Abbe and Zeiss. His firm, Schott & Genossen Glass Works of Jena, founded in 1884, went on to produce the glass used exclusively in the Carl Zeiss microscopes.

Ernst Abbe and the Carl Zeiss Foundation

When Carl Zeiss died in 1888, his son Roderick Zeiss sold all assets of the Zeiss Optical Co. to Ernst Abbe. Not having an interest in a sustained private ownership of the company, in 1889 Abbe created the Carl-Zeiss-Stiftung.

This for-profit foundation/trust was ruled by an elaborate set of statutes and principles which included:

- no private ownership of the Zeiss Company;
- its assets deeded largely to the University of Jena;
- management of the company to be handled by four directors on an equal basis;
- balance of the estate donated to the employees of Carl Zeiss.

The statutes also prescribe benefits for the employees, including paid vacations, sick pay, eight-hour work day, invalid and old age pensions for workers and their families, representation to management, banishment of discrimination based on race, religion, politics, and others.

The Stiftung was a business and social experiment that, in its content and scope, was way ahead of the times. Important in the context of this article is the Stiftung’s principle which aims to “support science and technology outside as well as within the enterprises, and the participation in projects that served the general good.” (10 Gale Directory of Com-
Comany Histories: Carl Zeiss AG; see also: 2 Auerbach)

Transition from Abbe to the next generation: Rudolf Straubel joins the firm

Abbe had hired, in 1884, the young optical physicist Siegfried Czapski (1861-1907) to be his assistant, who then became a close associate. Another "person of interest" for Abbe was Rudolf Straubel. Here is a short account of his early life and career before joining Zeiss.

Straubel was born on June 16, 1864 in southern Thuringia, the son of a protestant pastor. After attending high school in Gotha and Coburg, he studied in Jena and Berlin, with majors in physics and mathematics and minors in mineralogy and physical chemistry. He first came into contact with Abbe and Otto Schott in 1885. In the summer of 1888, Straubel received his PhD in Jena, with a dissertation on an optical problem suggested by Prof. Ernst Abbe.

From 1889 until 1901, Straubel pursued a university career in Jena, first as assistant at the Physics Institute until 1896, from 1893 on as adjunct professor; then from 1897 on as full professor. He gave lectures and performed research in numerous areas of physics, in particular optical physics, but also physical chemistry, geophysics, geodesy, crystal physics, thermodynamics and electrotechnics. (Jentzsch, p. 216)

During these years, Abbe consistently kept an eye on the young scientist. In the late 1880s and early 1890s he tried to persuade Straubel to come to work for Zeiss. But at that time Straubel declined, preferring instead to be involved in academia rather than industry.

In 1894, Straubel married Marie Kern (b. 1865), the daughter of a Jewish industrialist. The couple had four sons: Heinz (b. 1895), Werner (b. 1897), Wolfgang (b. 1899), and Harald (b. 1905).

In 1901, feeling that his strength was waning, Abbe again approached Rudolf Straubel. This time, Straubel agreed and joined Zeiss in the role of scientific consultant. An anecdote reports Abbe as saying "A weight is off my shoulders, now that Straubel has agreed to join." (26 Wandersleb) Important for Abbe were Straubel's scientific and managerial talents.

When Abbe resigned from actively leading Zeiss on September 24, 1903, he named Straubel "scientific director for life" on the four-member management team. The other members were Siegfried Czapski (who also became "bevollmächtigter," or power of attorney of the Carl-Zeiss-Stiftung following Abbe's resignation), Max Fischer, and Otto Schott.

Ernst Abbe died on January 14, 1905. Rudolf Straubel was Abbe's hand-picked successor, continuing the role of scientific head of Zeiss as established by Abbe.

Introducing Meyer and Bauersfeld

Two other persons need to be introduced as they would become important figures in the planetarium story: Franz Meyer and Walther Bauersfeld.

On July 1, 1903, Franz Meyer (1868-1933) joined Zeiss, the first engineer with a university degree hired by the dynamically growing optical company. The choice of Meyer was intended to aid with the construction of large astronomical instruments that Zeiss had just added to its product palette.

According to an anecdote, Straubel told Abbe that, in the near future, Zeiss would need to hire eight to twelve more engineers. Abbe appears to have remained skeptical vis-à-vis Straubel's prophecy which, however, soon was going to become reality. (20 Schomerus p. 130)

From August 1905 to June 1907, Walther Bauersfeld also worked for Zeiss as an engineer. Bauersfeld had attracted Straubel's attention because of his exceptional mathematical and engineering/construction skills. (20 Schomerus p. 171)

On April 1, 1908, Straubel succeeded in his effort to have Bauersfeld rejoin Zeiss as the leading engineer, and also to join the Zeiss management team, replacing Czapski, who had died on June 29, 1907.

The Carl Zeiss Company and the Deutsches Museum

In 1904, the Bavarian entrepreneur and engineer Oskar von Miller (1855-1934) founded the "Museum of scientific and technical master works" in Munich, Germany. His purpose was "to portray scientific research in its various development phases, and to show the effects that mutually stimulate science and industry from ancient times until today, in a manner as instructive and as easily understandable for the common people as possible." (9 Fuchs pp. 8-9)

For the astronomy department, von Miller thought to present an historic developmental series of instruments and artifacts; demonstrations of the movements of the stars and celestial bodies; and a functioning observatory. (9 Fuchs p. 38)

The cooperation between Zeiss and the Deutsches Museum began during the year of the museum's inception. In a letter dated July 16, 1904, Prof. Czapski of Zeiss accepted...
his election as member to the presidium board of the museum ("Vorstandsrat"), and he received a letter of thanks from von Miller on July 28, 1904. Four months later, in a telegram dated November 22, 1904, Czapski also accepted to lead the section “technical optics” at the museum. (1 Archive DM)

During its initial phase (1904-1905), the museum solicited to observatories all across the country a list of articles desired by its astronomy department, receiving a generally warm response. Among the respondents was Rudolf Straubel’s brother-in-law, Otto Knopf, professor for astronomy and head of the university observatory in Jena. Prof. Knopf, who was married to Prof. Straubel’s sister Hedwig, sent an enthusiastic response, but his observatory was too poorly funded he was unable to donate any desired items. (9 Fuchs p.11)

The museum finds assistance

The Zeiss Optical Co. in Jena, being in better financial shape, was able to assist the new museum in its goals. On April 4, 1906, Czapski announced that Zeiss would furnish one model each of the most modern reflector and refractor telescopes as exhibits to the museum’s astronomy collection. The telescopes were delivered to the museum in August 1908 and November 1909, respectively. (9 Fuchs p. 32)

While the donation of the exhibition telescopes for the museum’s instrument collection was significant, Zeiss’s later contribution to the planned observatory, and particularly the construction of the Zeiss planetarium, were to become of much greater importance.

Donation of a telescope for the museum’s west dome observatory by Zeiss

On August 12, 1912, in a letter to Zeiss, the museum wrote: “...in the large West dome of the Museum we plan to install a telescope particularly suited for demonstrations to the public, and we wish we could obtain from you such an instrument, as your company has a special reputation for construction of newer type lens- and reflector-telescopes.” (9 Fuchs p. 40)

Concurrently with the request for the telescope by the museum, von Miller had also invited Prof. Straubel to become a member of its presidium board (as Prof. Czapski was before them) and to take part at the annual meeting of that board (October 2 and 3, 1912); and moreover, to become one of three secretaries of that board. On September 29, 1912, two handwritten letters were sent from Zeiss to the museum, both in Straubel’s handwriting. The first letter is signed “Prof. Dr. Straubel,” the second letter is signed “Carl Zeiss.”

From the first letter: “I sincerely regret to have to inform you that I am still recovering from an illness and that therefore I am unable to attend the annual meeting of the Deutsches Museum. I regret this even more because I would have liked to thank in person for the honor bestowed upon me, and to personally have given you the news that the Carl Zeiss firm agrees to donate to the museum a telescope for the large West dome. Respectfully Prof. Dr. Straubel.” (1 Archive DM)

The second letter: “In response to your letter from Aug. 12 we happily agree that we will gladly donate for the large West dome of the museum a telescope, built according to our special construction methods, and suited particularly well for demonstrations to the public. We hope to soon be able to send you drawings and description. Respectfully Carl Zeiss.” (1 Archive DM; 9 Fuchs p. 40)

On November 25, 1912, Zeiss sent drawings and specifications of the refractor telescope to the museum. Oskar von Miller was said to be “full of joy.” (9 Fuchs p. 40)

Slightly before this, on October 23, 1912, a letter was sent to Prof. Straubel. “Your Excellence! This is to let you know that, during the meeting of the presidium board and the committee on October 2 and 3, you have been unanimously elected member of the presidium board, and simultaneously to its secretary. We express our particular delight that you hereby join the leading members of the presidium board, and we hope that you will continue to give us your advice and cooperation as you have done in the past. We thank you for your already expressed acceptance of your election, and sign with assurance of our exceptional respect. Deutsches Museum, Dr. Osk. v. Miller, Dr. W. v. Dyck, Dr. C. v. Linde.” (1 Archive DM)

It is important to state here that, in his 1955 article, Franz Fuchs mentions the donation of the telescope by Zeiss, and quotes the letter signed “Carl Zeiss.” However, he does not mention Straubel by name. In Fuchs’s article, Straubel is mentioned only once, in connection with Zeiss’s acceptance of the planetarium projects in October 1913. In turn, Straubel’s membership on the presidium board is never mentioned by Fuchs. These are omissions to which we will come back later on in this article.

The planetarium projects

In order to demonstrate the movements of the stars and celestial bodies, von Miller envisioned two mechanical devices, one heliocentric (or “Copernican”), the other geocentric (or “Ptolemaic”). Already in 1905, the Sendtner Instrument Company of Munich had fabricated one table-top-sized model for each of these “planetaria” according to von Miller’s specifications. But by the summer of 1912, von Miller had drawn up plans for a room-size Copernican planetarium with an electric motor engine, in which, similar to a clockwork, the planets Mercury, Venus, and Earth revolved around the sun, simulated by a light bulb in the center of the device.

Detailed plans were sent to mechanical and clockmaker shops in Munich and other parts of Germany, and were also published in six large-volume specialty periodicals. Several firms and individuals responded with proposals, but all were rejected by von Miller. (9 Fuchs pp. 54-56) Initially the Zeiss firm was not considered, possibly because it was specializing in optical products.

When asking for assistance in finding companies having the know-how necessary for executing his plans for the Copernican planetarium, on May 15 and May 20, 1913 von Miller wrote letters to Kurt Sorge, engineer and director of the Grusonwerke in Magdeburg (a Krupp subsidiary). On May 23, 1913, Kurt Sorge responded, naming three companies, in which the first on the list was “Carl Zeiss in Jena.” (1 Archive DM)

This could have been the cause for a letter to the Zeiss firm on July 22, 1913, asking if Zeiss could take on the Copernican planetarium project. But the response from Zeiss, dated July 30, 1913, and signed by Dr. Max Pauly of the astronomy department, was negative.
stating that the project was “not in our scope of work.” It remains unknown whether Prof. Straubel was involved in this response or aware of the request.

Von Miller's plans for the Ptolemaic planetarium were described on October 1, 1912: “In addition to the true movements of the planets as in the Copernican system, in a second planetarium we want to demonstrate the rotation of the sky and the movements of the Sun, Moon and planets as they appear in the sky when seen from Earth, according to the Ptolemaic system. To this purpose, the fixed stars are to be shown transparently on a sphere of about 7m diameter. In the center of the sphere the observer stands on a platform. The sphere signifying the sky is rotating once daily around its axis which is parallel to the world’s axis. This will allow that the fixed stars which are visible above the horizon in Munich can be positioned properly for any hour on any date. Furthermore, the Sun, the Moon and the planets are attached to movable arms, so that the apparent movements of these celestial bodies underneath the fixed stars can be executed in their corresponding times, which will allow the demonstration of the various conjunctions of the planets.” (1 Archive DM)

**Discussing projection techniques**

In the summer of 1913, the instrument company Sendtner in Munich again built a model according to this description by von Miller. But, back in 1912, the first notions of using optical projection techniques to demonstrate the movements of celestial bodies in a geocentric model had been discussed. One such idea involved using a film to project the movements of the sun, moon and planets.

A more significant projection idea originated from Swiss educator Eduard Hindermann, who used “shadow”-like projections of the motions of the planets, to demonstrate their ribbon-like movements when seen from Earth.

Hindermann wrote in a letter to von Miller, dated February 4, 1913: “The idea of using light projection can of course be applied and used with advantage when simulating the view of the world according to the Ptolemaic system, as I will gladly discuss with you.” Fuchs, von Miller's deputy, wrote: “Von Miller wants to preserve the priority and remarks: ‘Fuchs, write down exactly when we received this letter, and when the drawings showing the movement of (the planet) Mercury have been shown to us.’” (9 Fuchs p. 58)

Oskar von Miller discusses planetarium plans with Straubel

The tenth annual meeting of the presidium board and committee of the Deutsches Museum took place on October 1, 1913 in the auditorium of the Royal Bavarian Academy of Sciences in Munich. Prof. Straubel's presence is documented in the proceedings, and his role as one of three secretaries is publicly mentioned there for the first time. Von Miller had already met Straubel the day before and extensively discussed the planetarium projects with him. Here is an excerpt from the proceedings of the annual meeting:

“...Strangely, and despite multiple efforts on our part, no firm could be found that was willing to take on the manufacturing of these large, complex and completely new constructs (the planetaria). Then, yesterday, we succeeded to convince Herr Professor Straubel that this project would be a task particularly well suited for the Zeiss works which command over excellent scientific and technical resources, as well as over the best mechanical facilities. Furthermore, taking on this task would be completely in the spirit of the founders of the company, Zeiss and Abbe. Herr Professor Straubel has expressed the support of his firm in the construction of the giant planetaria, and I therefore have no longer any doubt that we can expect superb results with these museum objects as well.” (1 Archive DM)

On October 3, 1913, two days after the annual meeting, the museum wrote to Zeiss: “In reference to the talks between your Herr Professor Dr. Straubel and our president, Herr Dr. Oskar von Miller, we would like to express one more time our delight over the fact that you are willing to construct the two planetaria according to Copernicus and Ptolemy for the new building of our museum.” (1 Archive DM)

This, in fact, meant that Straubel accepted to take on both the Copernican and the Ptolemaic planetariums on Zeiss's behalf.

That Straubel was able to commit Zeiss's resources on such a short notice, without prior internal discussions at the firm, speaks for his enormous influence within the company at that time; for his conviction of how important he considered the work of the Deutsches Museum and Zeiss's support of it to be, in the spirit of Abbe as expressed in the Zeiss-Stiftung principles; and lastly, how important he personally considered the planetarium projects to be.

Of course, having the name of the Zeiss works and their scientific and technological prowess displayed so prominently at this new museum could also reap tremendous long-term public relations benefits. This would have been an important factor in his decision as well.

From acceptance of the plans to the projection planetarium concept

On October 7, 1913, less than a week after the announcement by von Miller, Zeiss engineer Franz Meyer was sent to Munich to study the designs proposed by the museum and to view the intended locations in the new building of the museum. Now that von Miller finally had a partner in his plans for the planetariaums, he felt a sense of urgency to press on with the project. The construction plans for the new museum building needed completion.

In a letter dated January 15, 1914, von Miller wrote: “In reference to the talks between your Herr Professor Dr. Straubel and the signed president, as well as to our letter from Oct. 3, we respectfully are inquiring about your progress in the preliminary work on the two planetaria. With utmost respect, Oskar von Miller.” (1 Archive DM)

Not receiving a timely response, a telegram was sent to Zeiss on February 21, 1914: “Since decision over planetaria is very urgent because of completion of building construction, we are asking for response via telegram if Dr. Fuchs can obtain the necessary information in Jena this coming Tuesday.” (signed) Deutsches Museum.” (1 Archive DM)

On the same day (February 21), Zeiss responded: “Dr. Fuchs welcome anytime.” (signed) Zeiss works.” (1 Archive DM)

**A momentous meeting**

The result of this exchange of telegrams was the momentous meeting on February 24, 1914 in Jena, with these participants: Prof. Dr. Straubel, Dr. Walther Bauersfeld, Obergnergieur (chief engineer) Franz Meyer, all from Zeiss, and Dr. Franz Fuchs as envoy of the Deutsches Museum (9 Fuchs p. 61; 3 Bauersfeld p. 75). Note that Oskar von Miller himself was absent from the meeting.

Fuchs later described the results of the meeting with these words: “In Jena I was readily shown the plans for their intended designs. For the Copernican planetarium, they wished to increase the room height, however this wish could not be granted because of our large concrete structures. With respect to the Ptolemaic planetarium, thoughts were presented to project the sky onto a white, fixed dome using high-quality optics, instead of constructing the rotating metal sphere.” (9 Fuchs pp. 61-62)

However, a more in-depth description of this meeting originates from Walther Bauersfeld, in an article published in 1957:

“The author, who had been a member of the Board of Management in the Zeiss works since 1908, attended a meeting at Jena between Oskar von Miller and the chief engineer [Meyer] of the astronomical department of the firm. On this occasion much was discussed about the difficulties of the construction, which appeared insurmountable. In this situation I asked the question: ‘Why do you want to make such complicated and heavy machinery? I think a much better way would...’ (Continues on Page 82)
The solar system on scooters

I was teaching revolution to a group of kinesthetic learners and we decided to get out the scooters and borrow the gymnasium at school.

I placed a large beach ball at the half court line and set out 8 scooters that were labeled for each of the primary planets. Eight students sat down on the scooters and modeled the solar system.

At first, when the students were moving, they were just concerned about keeping the planets in the correct order, making it so Mercury went the slowest and Neptune had to move very quickly to make sure that they were the furthest out.

We stopped and discussed if that was an accurate model of solar system. Looking at a table of the planets’ revolutions, the students were able to conclude that Mercury had to move faster than the others and Neptune was the slowest moving.

One of the students suggested that we start the planets and use some music to set a planet’s speed. You have to enjoy when the students expand on a lesson and make it better.

Approaches matched to methods

I have seen a great deal of improvement in the student’s application of astronomy knowledge since I started to use a variety of different approaches to instruction. The planetarium does a great job presenting information for visual, spatial, and auditory learners, but interpersonal and kinesthetic learners are kind of left out.

My interpersonal students reach deeper understanding of content by teaching it to others, so when possible we have a little bit of time for small group guided discussion. You just have to keep the discussion focused on the topic because it could wander off to different subjects (like did you know that they are serving strawberry skim milk in the cafeteria?).

This edition’s focus is not just going to be preferred types of learning, but I have recently applied a couple of instructional strategies to my planetarium.

Comparison Tables

Comparison tables are quick way for you to guide your students in organizing their thoughts. The table below is one that I have started to use for the students to prepare information that they can use to make a Venn diagram comparing two or three planets.

You can make comparison tables on a variety of topics: inner planets, outer planets, galaxy classification, elements, or star types. I experimented with giving the students blank tables that allowed them to fill in the comparison topics; students who are vested in the lesson will not have trouble developing these topics.

Students who may be struggling with the topics or are not fully engaged will select topics that are either too difficult to work with or so vague that they will not develop a reasonable depth of knowledge. I found that if you have a table that will compare five traits, and if you give the students four and make it so they pick the final topic, then that seems to be about ideal to demonstrate if a student has suitable depth of knowledge.

Quick writes

Quick writes are brief check points for seeing if the class, group, or audience is understanding the presentation. Our biology teacher likes to use Post-Its to have the students summarize the organ, organism, or system that was the topic of the day and post them on the door.

Our math teacher uses personal white boards for the students to write the math rule that was covered that day and a couple sample problems using that rule. They then pass the board to the student next to them to solve the problem.

I like to have the students use quartered sheets of paper to write a summary sentence (I use the instructional trigger “text me about the show”), and two to three keywords about the presentation.

A social studies teacher I work with integrated quick writing into her classes’ note taking strategies. The reason she wanted the quick writes in with the student’s notes because, at times, the prompts become part of the test.

I used a similar note format when I was teaching about planets and their moons. I found it useful, when after presenting one planet and its moon, to have the students describe what it would look and feel like walking on that planet (or its moon if it was a gas giant). For

<table>
<thead>
<tr>
<th>Planet</th>
<th>Radius (km)</th>
<th>Mass (kg)</th>
<th>Composition</th>
<th>Atmosphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mars</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

December 2013

(Continues on Page 58)
Once upon a time, long ago, I wrote a column titled “Sound Advice.” If you look through those old yellowed copies of Planetarian from the ’90s you’ll see articles about all sorts of audio topics. Most were answers to questions sent to me by planetarium professionals.

Well…we’re back. Since I believe in minimizing the space taken up by an article in this journal, the articles I author will be “skinnied down” to save space. To read a more detailed version, please visit www.bowentechnovation.com/ips.

Using alternate languages
The topic for this issue is how to implement alternate languages into your dome shows.

You have one language that is your primary language and other languages are considered the alternate languages. For example, at Biblioteca Aleandrina, Egypt, the primary language is Arabic and the alternate is English. At Karneid, Italy the primary is Italian with alternate languages in German, Swiss and English. In the United States, the primary is usually English and the alternate, usually Spanish.

Most countries have a requirement for ALS in public or educational sites (ALS can stand for Assistive Listening Systems or Alternate Language System). I have written about ALS in articles in various trade magazines and newsletters, so I won’t go into that here. Contact me at the email above if you want to read some of these and I’ll send the links.

In many cases these systems can be expanded to provide one or more alternate languages. Here is how.

The hardware
All these systems need:
1. A multiple soundtrack source.

All-dome systems: Some all-dome systems have the capability of providing one, two, or even more channels of narration tracks in addition to the primary 5.1 center channel. The primary language is typically on channel 3, and channels 7 and 8 are available for alternate languages.

If your system is set up for 7.1, that takes up 8 channels. However, some all-dome systems have as many as 16 channels available for audio. If not, you can add an external audio device that runs in sync with the show.

Traditional systems: If your system is an opto-mechanical system, it will use an external audio player that runs in sync with the show. How you use the channels can be exactly the same as I describe above. If your audio player is only 8 channels and you need more for languages, they typically jump from 8- to 24-track units.

2. A transmitter converts the audio from your source into radio waves (RF) or infrared (IR), which is broadcast about the dome.

3. The receiver receives the transmission from the transmitter and converts it back into listenable audio.

4. The headset can be earbuds, headphones, stethoscope style or a hearing aid T-coil.

Each of the S1 channels from the source feeds amplifiers and then speakers. The alternative language channel(s) from the source feeds the transmitter(s). Almost all modern audio systems now include a digital audio processor. This provides a hidden benefit to you for ALS. Cory Schaeffer from Listen Technologies (www.listentech.com) states:

“Some techs will send all audio through the ALS system, which may cause intelligibility issues. An ideal solution is to use a separate output from the digital router/mixer. This allows for a separate mix to the assistive listening transmitter that leaves out things that are unimportant to these listeners. For example, the priority should be the emphasis on speech. The surround channels can be greatly reduced or even completely omitted from the ALS mix. After all, subwoofer frequencies can’t be reproduced in a standard ALS ear piece.”

I agree with Cory. The audio processor lets you select which audio tracks are fed to which speakers and which tracks are fed to the ALS transmitters. The processor also lets you mix the levels of each track into the ALS transmitter so you can help make the narrative channels easier to hear.

I usually make the alternate language track strong with the L-R ALS channels a little lower, and the Ls-Rs reduced even more in level.

Transmitter/receiver types
There are basically three types of transmitter and receiver systems:

1. RF/FM. FM systems are ALSs that use radio-type broadcast technology. They are the most common type and offer mobility and flexibility when used with portable body-worn receivers.

The transmitter is typically installed in your audio system rack or at the console and has built in or remote antennas for the broadcasting. You set the transmitter to one or more of several selectable channels to send the specific alternate language to your visitor. Let’s pretend Arabic is on channel 1 and English on channel 2.

The receivers are handed out and are usually little shirt pocket or belt pack types. You set these to receive on whatever channel the desired language is transmitted. So to hear Arabic...

(Continues on Page 58)
EXPLODING UNIVERSE

Out of Devastation Comes New Creation

CLARK PLANETARIUM PRODUCTIONS PRESENTS ITS NEWEST ORIGINAL DOME PRODUCTION. LENGTH: 30 MINUTES, RESOLUTION: UP TO 4K, FRAME RATE: 30 OR 60 FPS. AVAILABLE NOW. CONTACT US AT SHOWSALES@CLARKPLANETARIUM.ORG

clarkplanetarium.org/distribution
many are reserved bands for fire, safety and security, the RF wireless spectrum is more complicated now than ever before. What frequency works in one part of the world is illegal to use elsewhere.”

2. Inductive Loop Systems. Wide area loop systems use an electromagnetic field to deliver sound. They offer convenience to groups of t-coil hearing aid users because those users do not require body worn receivers. Loop systems can be used by non-hearing aid users through use of headphones/earbuds and inductive loop receivers.

These are very common in Europe and are catching on very quickly in the USA. Keep in mind that a loop system must be carefully engineered and can’t just be put in anywhere. They can even cause interference with your video system if not designed correctly.

3. Infrared Systems. Infrared systems are ALSs that use light-based technology. They are not subject to any RF interference so the quality is excellent. But the receiver must be in line of sight to either the invisible light source or the reflected IR off the dome surface. Put it in a pocket, and no sound.

In conclusion
There are several methods for providing alternate languages. We have touched on the basics of wireless systems here.

If the audience is composed entirely of the alternate language listeners, a control system can switch your audio routing to play the alternate language track as the primary in the theater speakers, meaning the alternate languages do not have to be delivered by a wireless transmitter/receiver system unless you are playing in multiple languages.

As a reminder, you can read a more detailed version at www.bowentechnovation.com/ips.

Next topic? Send in your questions to jeffb@bowentechnovation.com.

Education, continued from page 55
older students, I had them describe the rule used to name the moons of a planet.

Lesson plan
When you send a lesson plan back with a visiting teacher, do you include these components?
Bellwork is a quick 3-5 minute introduction that reviews a general idea from the presentation.

Objectives need to be “student action” oriented; think “students will be able to…” or “students will demonstrate skills in…”

Procedures are the activities you want the students to do that provides them the opportunity to show their mastery of the objectives.

Summary is how you want to wrap up the lesson and have the students have close up the instruction. Summary can also be an opportunity for you to see how well students are understanding how this specific topic connects to the overarching topic.

Exit is how you want to have the students either finish the topic, lead it into another lesson, or end of the unit.

One Dome, continued from page 49
In 1583 he became a member of the Academia di Santa Lucia in Rome, and on November 11 of the same year Pope Gregory XIII nominated him Bishop of Alatri.

In 1586 he directed the work of erecting the obelisk in Saint Peter’s Square in Rome which he used as a gnomon and inscribed the solstices, the equinoxes and a wind rose on its base. After finishing the job, while on his way to Alatri, he died.

The Ignazio Danti Planetarium is located at the Allessandro Volta State Technical Institute of Technology, and offers programs to all levels of students and to the public.
Report from ASTC 2013

There was plenty of planetarium-related activity at the annual conference of the Association of Science-Technology Centers (ASTC), held October 18-22 in Albuquerque, New Mexico, USA.

System suppliers Zeiss, Sky-Skan, Evans & Sutherland, Konica Minolta and The Elumenati had booths on the exhibit floor.

Related exhibitors included the Franklin Institute, Google Lunar XPRIZE, Giant Screen Cinema Association (GSCA), Discovery Dome, Laser Fantasy, National Geographic Cinema Ventures, the National Oceanic and Atmospheric Administration, nWave Pictures, and Science First/STARLAB.

There were two planetarium-specific sessions. The first was “Bringing the Planetarium to Earth: Community Dialogues for Ecological Resilience,” led by Ka Chun Yu of the Denver Museum of Nature & Science, with presenters Jessica Sickler (COSI), Ryan Wyatt (California Academy of Sciences), Edward Gardiner (NOAA Climate Program Office), Matthew Linke (University of Michigan Museum of Natural History) and Jim Rock (Indigenous Education Design).

The second was “Hitchhiking to Pluto: Youth-Designed Planetarium Shows,” led by Nathan Bellomy (American Museum of Natural History) with presenters Rik Pangani-ban (California Academy of Sciences) and Lisa Hoover (Chabot Space & Science Center).

October 22 at ASTC was devoted to Digital Planetarium Demonstrations at the New Mexico Museum of Natural History, sponsored by Sky-Skan, Evans & Sutherland, Seiler-Zeiss, and Google Lunar XPRIZE. Giant Screen Day was held simultaneously in the museum’s IMAX theater, giving attendees the opportunity to network and see both kinds of content.

Evening activities included the ASTC reception, held at three museums. At the New Mexico Museum of Natural History, the planetarium was running versions of its popular Friday Fractals show.

An exhibit at the same museum on the origins of the personal computer had Jeri Panek of E&S revisiting her own connections to the formative years and innovators such as Alan Kay, who mentored her in the 1970s.

David Beining, founder of the annual Domefest in Albuquerque, organized a special “Party for the Hemispherically Obsessed” at the UNM ARTS Lab, well attended by planetarians, artists and students.

A subset of the new “Museum Screens” ASTC Community of Practice, spearheaded by Mary Nucci of Rutgers University, spent the day in a special workshop. Participants included leaders from IMERSA and from the Giant Screen Cinema Association. Discussion centered on the evolving applications of video and film for education in museums.

The IMERSA Board stayed on in Albuquerque for an extra day to meet and plan for the 2014 IMERSA Summit.

Laser shows: the next generation

During his talk at the 2013 IMERSA Summit, Ivan Dryer (see page 62) announced that laserist Brian Wirthlin would usher in the first Laserium revival in the James S. McDonnell Planetarium at the Saint Louis Science Center, which was one of the original Laserium venues. The show opened in April 2013 as part of the planetarium’s 50th anniversary celebration. Shows continue to run on Friday nights through December and possibly beyond.

Brian Wirthlin’s update has included digitizing the original analog tapes, and he continues to experiment with the imagery and music. 2013 is the 40th anniversary of Laserium, and it has also returned to the San Francisco Bay Area with a November revival at Chabot Space Center (Oakland). The shows feature music from Pink Floyd and The Beatles.

Other companies, such as Laser Fantasy, are active in the field as well. Six nighttime Laser Fantasy shows at the Fiske Planetarium in Boulder, Colorado include “Laser Gaga,” “Laser AC/DC,” “Laser Radiohead and “Dark Side of the Moon.”

Laser Fantasy has installations in numerous other cities, including Seattle (Pacific Science Center), Portland (OMSI), Cupertino (De Anza College), Rocky Mount NC (Rocky Mount Children’s Museum), Boston (Charles Hayden Planetarium, Boston Museum of Science), Pittsburgh (Buhl Planetarium, Carnegie Science Center) and a new one coming in Tijuana, Mexico (CECUT).

At the ASTC conference, Laser Fantasy’s Jay Heck observed, “We’re seeing a resurgence; when dome video came along, people stopped running laser shows, but now demand has rebounded.”

The Laserist maintains a list of laser shows at www.laserist.org/places.htm.

Recent fulldome awards

‘Imiloa Fulldome Film Festival (September 23-27, 2013) at ‘Imiloa Astronomy Center, University of Hawaii at Hilo

Best Visuals and Graphics: The Life of Trees, Softmachine/Reef Distribution

Best Audio Track: A Planet for Goldilocks, GOTO Inc.

Best Script and Story: Dream to Fly, The Heavens of Copernicus Productions

Audience Choice Award: To Space & Back, Sky-Skan & The Franklin Institute

Jackson Hole Wildlife Film Festival, September 23-27, 2013 in Jackson Hole, Wyoming, USA

Best Immersive 3D/Large Format (award sponsored by GoPro): Flight of the Butterflies, SK Films Inc. (Note: Flight of the Butterflies is being released for fulldome)

Best Immersive Fulldome: Supervolcanoes, Spitz Creative Media, Mirage3D & Thomas Lucas Productions, Inc, in association with Denver Museum of Nature & Science

Dome Festa at Hitachi Civic Center, part of the 4th International Festival of Scientific
World Leading Design & Fabrication
Planetarium & Multimedia Screens
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“Father of laser light shows” reviews high-voltage career

Ivan Dryer: 40 years of light

The following is excerpted from Laserium founder Ivan Dryer’s keynote speech at the 2013 IMERSA Summit in Denver, Colorado. The full transcript is available at www.imersa.org.

In November 1970, I attended a conference at USC called “Experiments in Art and Technology.” There, a physicist by the name of Elsa Garmire was showing some of her artwork, created with a laser in her laboratory.

A friend and I were invited to film what she was doing. We went out to her laboratory with a 16mm camera. When I looked through the viewfinder, I knew immediately this was not the way to present this medium. We were looking at something that required an environmental venue: a live presentation using a live laser.

In September 1970, we did our first demonstration for the Griffith Observatory, where I had worked on and off for 12 years. They said “No.” But gradually, we were on our way. The company that was to become Laser Images was incorporated in 1971. That December, we provided some special effects for I Dream of Jeannie: the first use of laser effects in a TV show. We then did some units for a rock tour with Alice Cooper: the first use of lasers for a rock tour. We had lasers at Magic Mountain, too.

My new partner, Charlie McDonald, and I set about building projectors. Elsa Garmire graciously loaned us the use of a laboratory at Cal Tech for a demo in June 1973 that was seen by the Griffith Observatory’s new director, William Kaufmann. “Let’s give it a try,” he said, and gave us a permit for four Monday nights in November.

At night and on weekends, Charlie and I worked on the projector and the music track. I like to think of the music as a bridal ensemble. It had something old: four classical selections from the 16th to the 20th Centuries; something new: art rock by Emerson, Lake, and Palmer; something borrowed: Cal Tjader’s cover of “Gimme Shelter” by the Rolling Stones; and something blue: which, of course, was “Blue Danube,” our signature piece.

We finished building the projector at 5 a.m. on opening day, November 19, 1973. At 8 a.m., I went home and took a shower. That morning, I appeared on Ralph Story’s Los Angeles show for five minutes with a little helium-neon projector with a lumia wheel. At 11 a.m., we had our press preview, which was our first run-through for the show.

That first night, we played to two half-full houses, amounting to some 700 people. By the end of that first run, on December 15, 1973, we turned away 500 people from our second show. We got a temporary, month-to-month operating permit and kept going for 28 years.

It turned out that whenever we laserists did something that was on cue, the audience would respond—no matter what it was. Such as when Charlie McDonald accidentally touched a high-voltage component. He was being continuously shocked and let out a mor-

(Continues on Page 64)
Imagine a laser pointer that's also a complete planetarium control system. The SciTouch hand-held dome controller gives you simple, intuitive command of all SciDome simulations and graphic menus so your movements instantly translate to action on the dome.

SciTouch lets you interact and teach in completely new ways: Select graphic menus and commands directly on the dome from anywhere in the theater; interact with objects’ positions, size, and movement using simple motions and one-touch operations. SciDome Touch is designed specifically for 360 degree dome control, so teachers and students become SciDome experts the moment they try it. Contact Spitz to learn more about SciTouch and the next generation SciDome Touch systems.
I worked on the projector and the music try," he said, and gave us a permit for four}[47x98]Monday nights in November.

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Novosibirsk Planetarium, Russia, Native

Fulldome LA, Vortex Dome, Los Angeles, Cal-

Fulldome LA, Vortex Dome, Los Angeles, Cal-

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3. Nizhny Novgorod Planetarium, Russia,

The Blind Man with Starry Eyes

Upcoming events

first International Fulldome Festival in

first International Fulldome Festival in

Russia, October 21-23, 2013.

Planetarium live presentations with real-

Planetarium live presentations with real-

fulldome shorts and clips:

fulldome shorts and clips:

1. Sky-Skan Inc., USA, Relentless Night

1. Sky-Skan Inc., USA, Relentless Night

2. Novosibirsk Planetarium, Russia, Native

2. Novosibirsk Planetarium, Russia, Native

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Ralph Heinsohn Artworks, Germany, Syn-

Ralph Heinsohn Artworks, Germany, Syn-

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1. Sky-Skan Inc., USA, To Space and Back

1. Sky-Skan Inc., USA, To Space and Back

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2. SOFTMACHINE GmbH, Germany, Life of

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Trees

3. Saint-Etienne Planetarium, France, The

3. Saint-Etienne Planetarium, France, The

Blind Man with Starry Eyes

Blind Man with Starry Eyes

Life of

(Continues on Page 74)
Two Modular Programs Designed For Live Interaction

THE MOON

Observe the moon's surface and how its appearance changes in the sky.

MEETS NATIONAL SCIENCE CONTENT STANDARDS FOR GRADES K-2.

THE WEATHER

Use your senses to explore the weather: learn how to predict and measure it.

Joanne Young  407-859-8166  joanne@av-imagineering.com
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International News

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These days I spend much time chairing a new Strömstad Academy project, the future study The Century of the Grandchildren. The first chance I got to present it outside Sweden was to the participants in NPA’13 in Tartu, Estonia, in September. It was an important audience, since within this project a multitude of specialists in different fields will each write a forecast for the next 87 years on one specific topic.

There are certainly several interesting topics that would be well handled by planetarians, so if you think that you might be interested in participating, please contact me at my stromstadakademi email address above. (See Guest Editorial on page 10.)

The International News column is built on contributions from IPS Affiliate Associations. So if you have news that you want colleagues worldwide to read, please send them to your IPS representative (see page 2). Their deadlines are 1 January 2014 for Planetarian 1/2014 and 1 April for 2/2014, so they need your news some time ahead of those dates. You who want to contribute news from parts of the world where IPS has no Affiliate Association are welcome to send them to Martin George, martin-george3@hotmail.com.

For contributions to this International News column, I sincerely thank Agnès Ackerman, Vadim Belov, Bart Benjamin, Ignacio Castro, Alex Delivorias, John Hare, Ian McLennan, Loris Ramponi, Aase Roland Jacobsen, Patty Seaton, Zina Sitkova, Christian Theis, and Michele Wistisen. I wish you and other representatives back with news for upcoming Planetarian issues, as well as an interesting new year with, hopefully, a beautiful Comet ISON in the sky.

Association of French-Speaking Planetariums

The new planetarium in Reims (Champagne-France) opened its gates on 6 September after nearly 18 months of work. About 400 personalities and guests took part in this prestigious event. Madam the Mayor of Reims thanked all those being at the origin of the creation of a planetarium in Reims, nearly 35 years ago, and thanked also the municipal services which allowed this project of transfer and modernization to succeed.

The festival continued during the two following weekends. More than 6,000 people could admire the splendid sky dome done by the new ZKP4 Zeiss projector on the 8-m (27-ft) dome, and took part in various animations. It was an unforgettable memory for all the team of the planetarium and its leader Philippe Simonnet, all being very happy for the continuation of this great adventure.

The Jeunes Sciences Picardie Maritime (JSPM) team conducted by Patrick Hamptaux welcomed children and teachers inside their mobile dome, where many short educational sequences were shown by a new LSS fulldome system.

They proposed to set up their small opto-mechanical projector (with their JSPM dome) in a room of the school Boucher de Perthes at Abbeville, where it would be useful for all the schools wishing to supplement their courses in astronomy. During the Fête de la science in Abbeville, Patrick presented his kitchen of stars under the dome.

Representatives of the APLF Council met with Daniel Schlup in Luzern to prepare the 30th APLF conference, to be held 1-5 May 2014 in Luzern. This event will also host the annual conference of APLF’s friends, German’s GDP and Italy’s PLANIT: a great symposium, hopefully with Thomas Kraupe, IPS president, present. If IPS members wish to attend, please contact daniel.schlup@verkehrshaus.ch.

Association of Mexican Planetariums

As partially reported in the previous issue, the AMPAC XLI meeting took place at the German Martínez Hidalgo Planetarium in Puebla, Puebla, 26-28 September, gathering representatives from 17 planetariums throughout Mexico.

Lectures included various topics from The Large Millimeter Telescope (LMT) or Gran Telescopio Milimétrico (GTM) Alfonso Serrano, a project developed by the University of Massachusetts, Amherst, and the National Institute of Astrophysics, Optics and Electronics (INAOE), at 4581 m (15029 ft) above sea level.

Dr. Víctor de la Luz, as a radio telescope astronomer, explained the basic operating principles of the radio telescope and the tasks he confronts with daily, anticipating explanations for the site visit which followed the meeting.

Javier Menchca explained new low-cost productions, including 3D animation, using free software; Germán Martínez, from the Puebla Astronomical Society, explained how to use, in astronomy workshops, the bi-weekly sky pages supplied under license from Creative Commons to find constellations, very popular with children. Other topics presented were planetarium low cost production techniques and planetarium funds collecting.

An open invitation to join IPS membership was made to new and old planetariums. An individual IPS membership has been difficult, due to payment in US dollars.

Evans & Sutherland representatives demonstrated its Digistar 5 capabilities in a demo. Most interesting was that the Veracruz Naval Military School is in the processes of upgrading its opto-mechanical planetarium projector.

AMPAC held elections for President Elect 2014-16, resulting in Eduardo Hernández from
Planetarium Torreon being elected. He has recently been AMPAC President. He commented that the formal inauguration of his institution will finally take place on 29 January 2014.

The AMPAC meeting ended with a visit to the LMT telescope, being a wonderful and educational visit.

**Canadian Association of Science Centres**

**Manitoba:** The Manitoba Museum’s planetarium in Winnipeg opened *Stars of the Pharaohs*, produced by Evans & Sutherland, in October 2013. The show premiered in conjunction with an Egyptian exhibit in the Alhallow Hall exhibition space, and represented the first experiment in co-promoting planetarium programs and travelling exhibitions.

Holiday shows running in December include Geographics’ *The Alien Who Stole Christmas* and Loch Ness Productions’ *Season of Light* (formerly ‘’Tis the Season’), both fulldome versions of the traditional December show offerings.

The planetarium celebrated one year of fulldome operations in October, and the staff continues to explore the capabilities of the DigiStar 5 system for live and scripted programming. In addition to conventional astronomy shows and pre-recorded fulldome movies, the system is used for live video and DJ performances and as a test bed for a local video game company working on a fish-eye plug-in for their first-person simulation games. Contact: Scott Young, scyoung@manitobamuseum.ca.

**Vancouver:** Recent close encounters reported by local UFO bloggers were actually the result of an elaborate hoax masterminded by the H.R. MacMillan Space Centre, Vancouver. A drone in the shape of the space centre was captured by web cams, camera phones and video in and around several Vancouver locations, including a large stadium where the Vancouver Canadians baseball team plays.

The space centre worked with Vancouver ad agency MacLaren McCann in developing this “extreme teaser campaign,” which consisted of strategically releasing web cam photos of the drone sightings through social media to UFO bloggers and Twitter and Facebook. A YouTube video of the baseball stadium sighting captured more than 200,000 hits alone.

The campaign was complemented by the release of an inventive new PSA, showing that same space centre-shaped UFO flying in and replacing the old with the new building. A slogan follows: “New and improved. H.R. MacMillan Space Centre Planetarium Theatre.”

“We want to show Vancouver, BC and the world that you can truly have a rare experience by exploring the exciting new shows and state of the art projection system. The buzz we are creating seems to be working, as attendance is up 65 per cent compared to this time last year,” said Rob Appleton, space centre executive director.

The attendance boost mirrors that of the Manitoba Museum, whose planetarium also went digital a year ago and saw a 50 per cent increase in visitor volumes. Similar to its prairie counterpart, the space centre is destined to embrace unconventional uses of its revamped system.

First on the docket is a new program debuting in November called *Through the Lens: Building Vancouver’s History.* The indoor digital walking tour will give the audience a chance to experience Vancouver streetscapes as they have evolved over the past century.

There are also plans to make the projection space available to corporations, foundations and other organizations for unique presentation purposes, including medical schools wishing to demonstrate surgeries with an immersive and close-up perspective.

“Thanks to these recent changes and innovations, the space centre has gone from being a kind of beloved and well-respected Vancouver time capsule to a timeless expression of this new technological age. The possibilities are endless. If you can digitize it, we can show it,” added Appleton. Contact: Rob Appleton, rappleton@spacecentre.ca.

**European/Mediterranean Planetarium Association**

**Croatia:** The Astronomical Centre Rijeka (Rijeka Sport Ltd.) in Croatia participated in October in activities to celebrate World Space Week 2013: Exploring Mars, Discovering Earth, with the live planetarium show *Curiosity Discovers.* The show focused on the most recent discoveries made by the Curiosity rover on Mars, from its landing to the present.

On 5 October, in collaboration with the head of Team Stellar, Stevan Bedič, and members Kristina Ozvald Cačić and Vilko Klein, it organized a public lecture on the “Google Lunar X PRIZE and the Future of Space Mining.”

Team Stellar also presented, for the first time in Croatia, its new project Balloon Stellar–Stratosfera, which involves the participation of secondary school students in the conduction of an experiment, by launching balloons at an altitude of 30 km and subsequently analyzing the data collected.

In addition to the above, the Astronomical Center Rijeka organized three international culture events, the first of which was the International Literary Festival Literary Link, co-organized with the Croatian Writers’ Society. During that event, writers from the United States and Croatia read and discussed their works in the planetarium dome under the stars.

The second cultural event was the International Symposium on the Anthology of Smuggling, organized by the Museum of Modern & Contemporary Art, in collaboration with the Contemporanea Gallery in Trieste, Italy and the Mestna Museum in Idrija, Slovenia.

Rijeka Planetarium also participated in the celebrations for the Italian Days of Language and Culture, showing for the first time in Croatia *Maksimovic: The story of Bruno Pontecorvo,* a film, directed by Diego Cenetiempo and dedicated to Italian physicist Bruno Pontecorvo, whose far-reaching insights have represented milestones in modern physics and, in particular, in the study of neutrinos. The film was
shown thanks to the cooperation with the Italian Consulate General from Rijeka and the Center for Nuclear Physics in Trieste.

In mid-October, Astronomical Center Rijeka participated in the worldwide activities to celebrate Mathematics for Planet Earth 2013, a worldwide initiative endorsed by UNESCO, focusing on the most urgent planetary problems that mathematics can address.

That workshop took place in the last two months in three Croatian cities and focused on possible solutions to several of the biggest problems affecting our planet.

November brought two additional live presentations in the digital planetarium, the first of which presented project Laika, while the second, held in 15-19 November, focused on the Leonid meteor shower. Finally, the Astronomical Centre Rijeka celebrated Children's Day in the digital planetarium, while in December it planned afternoon shows and live presentations of the Next Generation Space Telescope.

**Greece:** With the emergence of the economic crisis in Greece, the New Digital Planetarium of the Eugenides Foundation in Athens decided to establish some free-of-charge shows, giving the opportunity to people with financial difficulties to be able to enjoy the immersive experience of digital planetarium shows at no expense whatsoever.

Thus, apart from the free-of-charge shows during the premieres of its new productions, the New Digital Planetarium, starting in December 2009, added 3 free-of-charge shows on each of the equinox and solstice days.

In this spirit, this year's autumnal equinox continued at IPS representative.

The show was presented to the public by Jean Creighton, Dayle Brown, Samuel Knapp and Jesse Jahn. Left: Sydnee Hamrick adds extra excitement to making a comet by juggling three nuclei. Photos by Dan Goins.

**Great Lakes Planetarium Association Illinois.** In October, the Peoria Riverfront Museum hosted conferences for both GLPA and the Illinois Association of Museums, in addition to presenting four planetarium shows and a selection of AVI laser light shows.

Dayle Brown won the vote for president elect, Cheri Adams was elected as treasurer and Dan Tell as secretary. Jeanne Bishop continues at IPS representative.

GLPA: Top: Chuck Bueter helps Amera Platt make a comet at a workshop during the GLPA meeting in Peoria, Illinois. Watching are, from left, Deb Lawson, Renae Kerrigan, Jean Creighton, Dayle Brown, Samuel Knapp and Jesse Jahn. Left: Sydnee Hamrick adds extra excitement to making a comet by juggling three nuclei. Photos by Dan Goins.
The target reopening date is February of 2014. At the University of Michigan Museum of Natural History in Ann Arbor, a series of after-midnight programs have been developed to offer alternatives ways for students to party on campus. The Dassault Systems Planetarium in Detroit recently featured Hitchhiker’s Guide to the Solar System, a light-hearted view of the solar system. John Schroer is currently recovering from a serious illness. The planetarium is being operated by Don Klasen and Jennifer Bridges. The planetarium has a new technical director, Howard George. Recently the planetarium production team has resumed work on a sun-oriented planetarium show that will be produced for both fulldome and traditional systems.

Ohio. Bryan Child is the new director at the Shaker Heights High School Planetarium, following the retirement of Gene Zajac. Bryan himself brings years of experience in the planetarium to his new role and is looking forward to working with their new Spitz SciDome Touch HD system.

Fran Ratka reports that the Scheule Planetarium at Lake Erie Nature & Science Center had a busy summer of rocket camps for all ages. Children ages 7 through teens learned about aerodynamics and rocketry, played with hands-on physics, and built and launched gliders and Estes rockets.

Jim Gavio reports that the Erie Planetarium (Pennsylvania) is displaying their planetarium banner, poster board and flag which were all carried on the last flight of the Shuttle Endeavor by their astronaut friend Mike Fincke. After 53 years of operating continuously in the same place, the Erie Planetarium is moving to Behrend College, the local Penn State branch.

Curt Spivey reports that at the GLPA conference last year, he was fortunate enough to win a week’s rental of the Prismatic Magic Laser system, which turned into a wildly successful attendance weekend in February. YSU’s original show Cosmic Castaways is now up on the CosmoQuest website (cosmoquest.org) along with other free planetarium resources.

Dale Smith and Nick Anderson from the Bowling Green State University Planetarium attended the Spitz Institute this summer to learn Starry Night, ATM-4 automation, and the conversion of legacy shows in preparation for the installation of SciDome at BGSU next year. Back at BGSU, Ash Enterprises installed a set of lifts on the Minolta star projector and Astro-Tec repainted the dome they installed 30 years ago.

Wisconsin/Minnesota. The Daniel M. Soref Planetarium in Milwaukee started up their NASA CREATE grant that immerses local high school students in astronomy. In November, Soref premiered an original production Chasing the Ghost Particle: From the South Pole to the Edge of the Universe. The show features Ice Cube, the world’s largest and strangest telescope buried in the ice at the South Pole, which captures neutrinos, the tiny “ghost particles” that help to solve several huge cosmic mysteries.

The University of Wisconsin-La Crosse Planetarium presented Two Small Pieces of Glass for its October public program and Cosmic Castaways for November. Weekly Album Encounters light and laser shows were also presented.

The University of Wisconsin-Milwaukee Planetarium hosted a special event in early October titled Black Hole Bash, that included discussions with black-hole experts, an NSF-funded exhibit, a special planetarium program, a cookout, and music. In addition, Shooting Stars was the topic for the Friday night shows in September, and in late fall, the theme was Fall Stars and their Myths.

Italian Association of Planetaria

A new PlanIt prize, organized by Italian Association of Planetaria and called To Tell the Stars, is open to everyone, not only planetarians. Prize rules invite applicants to write a story, a lesson or an original short text that will be written to under a planetarium dome. In fact, the author of the text is also invited to read the story and to collect the registration in an mp3 file.

The subject of the story is open, but should be connected with the celestial sky. The complete script necessary to show the sky described in the story is required to be enclosed, together with the written text and the sound registration.

The deadline for the first issue of the prize is 28 February 2014. In the website of PlanIt (www.planetari.org) is the complete description of the prize rules available. In fact now, each year, PlanIt plans to organize three different prizes.

To encourage the participation of small facilities and young planetarians during the annual meeting of Italian Planetaria, PlanIt supports, with a prize, communications presented in the occasion of the National Conference. Applicants interested in the 12-13 April 2014 National Conference at Modena Planetarium must contribute their proposals before 28 February. A committee will select the winner that receives financial help to cover travel and hotel expenses.

PlanIt organizes also the second issue of the prize devoted to a video, Power Point projection or something else about any astronomical and astrophysical subject. The target of this audiovisual product will be students ages 11-13. The author of the most interesting product, selected by a special commission, will win a prize of 500€. The audiovisual product will be freely available for PlanIt members.
People interested to participate in the competition need to send their proposals, in digital format, to PlanIt (planit-news@libero.it) before the end of February. Each audiovisual product presented in the contest needs to contain the following texts:

Associazione dei Planetari Italiani (PlanIt); name of the author; title of the product; and “Premio PlanIt anno 2013.” The name of the winner will be disclosed next March. The awarding of prize will be given in Modena 12-13 April 2014.

Since the opening of Planetarium Alto Adige in South Tyrol, the staff has worked to expand knowledge of it through the autonomous district of Bozen and beyond. It is a modern building that has up-to-date technologies in digital projection. There are five projectors which create a fulldome 3D sky, supported by E&S’s newest Digistar 5 software.

The shows are intended for two main audiences: the schools and individual visitors. Any class can receive a customized show, according to teachers’ request. All the shows offer an introduction to the instrument and allows viewers to observe the whole night in less than 5 minutes. The software recreates the night that comes, so every day a different sky is presented.

Then follows a movie and at the end is question time, when the audience may satisfy its curiosities. This is regarded as the most important highlight of the show, for it creates a friendship between audience and scientific mediators, and so with astronomical issues.

In the next few months, the Planetarium South Tyrol will offer musical shows, naked-eye observations, and scientific meetings in the beautiful background of Eggental.

For information: www.planetarium.bz.it and info@planetarium.bz.it

**Middle Atlantic Planetarium Society**

There are new projects underway in the MAPS region. At the University of Maine, Alan Davenport, MAPS president and Maynard F. Jordan Planetarium director, is watching the new Emera Astronomy Center rise from the earth to house the largest telescope and planetarium dome in the state.

The new home of the planetarium and observatory will hold a 33-ft tilted dome and Sky-Skan 4K system for audiences of up to 50. The completely remote-controllable observatory will hold a PlaneWave Instruments CDK 20-inch reflector plus portable instruments for student use.

The center’s planetarium will be the first geothermal building on the Orono, Maine campus and is on schedule to be completed in spring 2014.

There are also big changes in New York state. The Whitworth Ferguson Planetarium at SUNY-Buffalo is in the midst of a complete transformation. As part of construction of a new science and mathematics complex, the previous facility officially closed in January 2013.

Before that, the last few years saw a resurgence of attendance at public programs with many presentations being sold out. The planetarium “went out with a bang” as staff offered 17 different public astronomy and space science programs throughout 2012, as well as two months of laser music shows. Combined with school group and other private group visits, over 10,000 visitors took part in plane-

(Continues on Page 72)
Develop a renewed appreciation for our fragile planet. Sigourney Weaver narrates this immersive excursion that explores a universe filled with the possibility of life.

Narraed by Academy Award winner Jodie Foster, Life launches the audience on a journey through time to witness key events since the Big Bang that set the stage for life.

Earthquake explores the forces that transform the surface of our planet and influence the course of human history. Narrated by Benjamin Bratt.

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ed with a guided tour to the old downtown of Tartu and the very interesting Old Observatory of Tartu, presented by Jaak Jaaniste. Kai Santavouri invited the Nordic Planetarium Association to the next meeting at the Heureka Science Centre in Finland. That will be in September 2015.

During the membership meeting in Tartu, the NPA By-laws, which have been the same since NPA was formed in January 1990, were updated. A new board was elected for the years 2014 and 2015. Aase Roland Jacobsen continues as president and Lars Petersen as secretary/treasurer.

In Aarhus, Denmark, the local authorities had invited the Steno Museum to participate in the great sailing ship arrangement, Tall Ships Races, at the beginning of July. For four days a small pavilion was our base at the harbor together with other Aarhus museums. Ole J. Knudsen and Aase Roland Jacobsen from the Steno Museum Planetarium decided that the visitors could engage in activities and acquire knowledge about the themes voyages of discovery and navigation at sea. Furthermore, Center for Teaching Aids, Viborg, was so kind as to lend StarLab mini-planetarium to use at Tall Ships Races.

In the planetarium we told about navigation by the stars, the starry sky of summer and the constellations at different latitudes. In the pavilion, our large relief globe was a great attraction. Visitors also had the opportunity of learning how to handle a sextant, and the younger children could engage in the activity “draw your own solar system” as well as paint and assemble a mobile with the sun, the Earth and the moon.

At Tall Ships Races the planetarians had the opportunity to show colors; talk with a lot of interesting people, and maybe inspire some to seek more knowledge about their themes. In any case they had some new experiences and a break from the daily work.

**Russian Planetariums Association**

Barnaul Planetarium organized the Festival of Knowledge on 2 September. To the sound of merry songs about school, the astronomical contests were held. Children drew pictures of the moon, the sun, the stars, the planets, and flying spaceships to them on the asphalt in front of the planetarium. After that they went on participating in the artistic contest in the starry hall.

Vladimir Planetarium took part in the celebration of City Day on 17 August. Some telescopes were set up in order to observe the moon. The young and the old came to see it. Wonderful atmosphere, the clear sky and the bright moon—all these things helped to make people interested in astronomy. The planetarium began a new educational year displaying artistic works and having a traditional concert.

In Kostroma Planetarium, the equipment had been established and launched for the domical show this summer. During the presentation, the domical show *Terrestrial Phenomena for Lunar People* was successfully demonstrated. On the Day of Science, the theatrical play *What did the Know-Nothing boy know about?* was performed.

In the Lytkarino Planetarium in the Moscow region, the best works of the third re-
The largest number of works was represented in the theme *The Man and the Universe*. According to the conditions of the contest, the picture was to convey the most important events in the history called *How the Man Explores the Universe*.

In Moscow, the Cultural Center of Armed Forces Planetarium celebrated the Day of Knowledge for three days. The students of educational establishments of the Ministry of Defense were invited. This meeting made a strong unforgettable impression on them. Children and veterans thanked for the film *Valentina Tereshkova: The way to stars*. The film was made in honor of the 50th anniversary of the first spacewoman’s flight.

Nizhny Novgorod Planetarium hosted the fall astronomical conference *The Problems of Physics and Astronomy in Secondary School*. 150 teachers took part in it.

In Novosibirsk, unfortunately E.A. Lugovskaya (04/03/1960-18/07/2013) passed away. She worked as a director of the planetarium of the Siberian State Academy of Geodesy. This sad news shocked all the people who knew her: relatives, colleagues, students.

An astronomer, an honorable land surveyor, a member of the Academic Council, she was a talented person who organized many interesting astronomical events in the city. In addition she was a broad-minded person, a reliable friend.

The 8th Siberian astronomical forum *SibAstro* 2013 took place in the camp Chkalovets, the first time without her presence. In the warm atmosphere, poems and songs were performed in honor of Elena Lugovskaya. Spaceman Andrey Borisenko was invited to participate in the forum lectures. For schoolchildren, particular events were planned such as quizzes and personal projects about space.

This summer a new observation area was opened near the Perm Planetarium. It is an opportunity to see some panoramic views of the city as well as celestial objects by means of telescope and binoculars. On 7 August, the delegation of the Russian Federation of Cosmonautics headed by the president, spaceman V. Kovalyonok, had a meeting with students, teachers and veterans of cosmonautics and space industry of the region.

St. Petersburg Planetarium organized a festival for first graders by the beginning of the new educational year. In the foyer, an astrol- oger played games with children, the film *A trip around the Starry Sky* was showed, and every schoolchild was awarded with a medal. Finally, one space probe made up with balloons was launched.

On 18-21 September in Tomsk, the international festival of educational films *Intellect-21st Century* was held. Tomsk planetarium demonstrated films made by the studio Roscosmos. There was a program called *A Lesson from Space* with the recorded spacemen’s welcoming speech being on board of the spaceship. Some 900 schoolchildren became participants of the festival.

### Society of the German-Speaking Planetariums

On 17 September 2003, the first fulldome-decade in Germany started with the opening of the Mediendorf at Kiel University of Applied Sciences. It is a lecture room and working place for the students of the master course of multimedia production. Some 330,000 public guests have visited the 9-m dome since 2003.

Different shows, such as planetarium programs, a presentation about the rain forest in Costa Rica, and an interactive dance performance, have been produced at the Mediendorf.

On behalf of the European Space Agency (ESA), the production *Touching the Edge of the Universe* about the history of space exploration was created in Kiel. It found its way to domes in 22 countries and was translated in 15 languages.

The show *Darwin and his fabulous orchids* received five international design awards. The program *The little polar bear Lars* got an UNESCO seal regarding education for sustainable development. Quality of service is an important topic for the team of the Mediendorf as well. So the dome was awarded with the German seal for Quality and the first Service-Award in Kiel.

The team of Mediendorf professionals collaborate with volunteers as well as with students, all of them with a huge quantity of enthusiasm. The team often hosts international guests, for example the next meeting of the Digistar Users Group in September 2014 will be held here, the first meeting of this group in Europe.

In June 2013, heavy rains caused inundation in the Czech Republic, Austria and in parts of Germany. The Saale river in Halle spilled over and flooded several areas of the city, by this creating the severest inundation since 400 years.

Located on an island in the river, the planetarium, which solemnizes its 35th anniversary this year was flooded too. Albeit it was built on a raised platform, the flood reached a level of 1.60 m in each room. The Spacemaster pro-
the fulldome video production. It will be
into an immersive video program.
, written by Jon
Association
um might become also its new birthday.
the 35th anniversary of the planetarium
structed, but now on a safer location. Thus, in
the Space Flight Planetarium will be recon-
more investments to the building of the for-
their work.
Scientists and students took care of the inquir-
ing early stage researchers and accompanied
Within the planetarium’s Astrolino project,
run by the Society of Astronomical Educa-
tion, young pupils made their first steps into
the universe and school teachers received a
special training on astronomy in cooperation
of the Tellus Science Museum in Cartersville,
Georgia. Further information regarding
SEPA can be found

Southeastern Planetarium Association
SEPA is now in the process of converting
its production of The Planets, written by Jon
Bell and narrated by Star Trek’s Kate Mulgrew,
to an immersive video program.
Troy McClellan of FullDome FX is doing
the fulldome video production. It will be
available to SEPA members as a free download
beginning in 2014.
The show will be 36 minutes long, and will
come with both a fall-winter and spring-summer
evening star identifications, and features
Jonn Serrie’s electronic arrangements of Gus-
tav Holst's The Planets suite.
The 2014 SEPA conference will be host-
ed by the Buehler Planetarium at Seminole
State College in Sanford, Florida. The location
is close to Orlando. Conference dates are 15-19
July. Details will be furnished in the next issue
of the Planetarian.
The site for the 2015 conference will be
the Tellus Science Museum in Cartersville,
Georgia. Further information regarding
SEPA can be found on

Gary Meibaum, a
long-time SEPA and
IPS member, passed
away on 7 Octo-
ber 2013. Gary was
a recipient of SEPA’s
Paul Campbell Fel-
losophy Award and
had served as presi-
dent of the organiza-
tion.
He was the past
director of the plan-
etarium in Luling,
Louisiana, and was active on a number of
SEPA committees. He was also a gourmet in
every sense of the word. He would readily
share his knowledge of off-the-beaten-path
restaurants in New Orleans and would accompa-
cyou to them in a heartbeat.
An additional tribute to Gary appears on
page 86.

I want to go to the planetarium for a date..
I'm a sucker for constellations and nebulas
and space it's just beautiful.
I want to go to a planetarium show with
someone who its actually interested in that
stuff, not someone who just wants to go see
some stars
I want to go to the natural history museum and
the planetarium to learn about non-base-
ball things so I missed it.
if i take up astronomy can i work in a plan-
etarium that kinda sounds really really cool

GDP: The planetarium in Halle (lower left) flooded by the river Saale in spring 2013. Courtesy of Luft & Liebe Ballonfahrten, Björn Danzke.
150+ theaters, 16 languages and counting...
Science in School: an excellent resource:

While visiting the European Southern Observatory headquarters this summer, I discovered an interesting magazine that was freely available on a rack in the lobby. It is called *Science in School* and it’s a European quarterly journal for science educators. It is available in several languages on the internet at www.scienceinschool.org.

The magazine “is published by EIROforum, a collaboration between eight of Europe’s largest inter-governmental scientific research organisations (EIROs).” You can learn more about the collaborative effort and information about the supporting agencies at www.eiroforum.org.

The eight supporting agencies are: CERN (European Organization for Nuclear Research), EFDA-JET (European Fusion Development Agreement), EMBL (European Molecular Biology Laboratory), ESA (European Space Agency), ESO (European Organisation for Astronomical Research in the Southern Hemisphere), ESRF (European Synchrotron Radiation Facility), and the European XFEL (European XFEL Free-Electron Laser Facility).

The journal’s focus is on interdisciplinary science education, therefore it contains articles about a variety of scientific disciplines along with news from the eight member organizations. Also included are teaching materials, information about cutting-edge science, research projects in science education, interviews with scientists and teachers, book reviews, a calendar of European events for teachers and schools, and a variety of other useful resources for science educators. You can access all articles and resources free of charge!

Articles specifically related to our work in Issue 26, Spring 2013, include:

- “Cracking the mystery of how our planet formed” By Jérôme Ganne and Vincent de Andrade, “Studying the chemical composition of some of the planet’s oldest rocks has revolutionised our understanding of how our continents formed.”

- “Casting light on solar wind: simulating aurorae at school” By Philippe Jeanjacquot and Jean Lilensten; read this to discover some tips on classroom experiments/demonstrations that simulate the Earth’s aurorae and the Van Allen Belt, demonstrate the Lorentz force, aurora on the sun and an ingenuous sun/Earth model.

- “Life without the Moon: a scientific speculation” by Erin Tranfield. As the title implies, the article describes first what the Earth would be like if it never had a moon, and then what it would be like if Earth suddenly lost its moon.

- Included is a heartening report about the next generation of scientists who presented their work at the 2012 European Union Contest for Young Scientists in Bratislava.

There’s a feature article about how to rescue leaning towers and articles about a classroom lab activity on the genetics of obesity, a discussion of stem cells and spinal cord injury and description of a thermometer that goes to 200 million degrees! You should be able to find something of interest in this journal that is a gem of a find.

To read the whole issue, see: www.scienceinschool.org, where you also can find the most recent issue and archives.

Thank you EIROforum for your excellent contribution to education!
that is how many frames you can get from us in one purchase. we now offer our entire library under a single license. this means you receive an inventory of some 500 allskies, 600 time lapse and about 200 live action clips from around the world covering any topic you would raise under a dome. it is a one-stop solution for all planetariums actively producing shows and will give all others a decade worth of live presentation backdrops.

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*by now the time lapse alone covers 500,000 frames, and the live action footage easily doubles that. it may well be even more by the time you order...
Zeeshaan and Mario, along with their equally creative staff and volunteers at Immersive Theatres, have taken portable domes to a new level with immersive experiences that include science, art, music, and even dance for schools and corporations as well as public and private events! They describe what they do in six areas:

**Education:** five levels: astronomy, biology, chemistry, physics and history (a choice from 60 immersive videos or a live program);

**Entertainment:** immersive music, dance, performing art and kaleidoscopic visuals in portable domes for any special event (birthdays, weddings etc.);

**Business:** entertaining clients, team building and product launching events;

**Video Production:** traditional and full-dome video;

**Astronomy Courses:** online distance learning classes;

**Products:** digital planetarium systems, full-dome (360 degree) films and operating software.

They can make presentations with an indoor dome or outdoors with a 13 m marquee dome. This team will continue to expand their offerings in unique ways; keep an eye on them and you may expand your horizons! (www.immersive-theatres.com)

One project that Immersive Theatres is working on currently is DataSea, a real-time 3D installation by a leading UK professional artist who is creating science-art content for mobile domes. Mario explains: “DataSea is an artistic but scientifically highly accurate representation of the radiosphere (www.takeo.org/nospace/ns030). Version 2.0 has been adapted for mobile domes and was launched at the Victoria & Albert Museum in London last month.”

**StarLight in Italy**

My good friend Simonetta Ercoli from Italy wrote to let me know about a new program. She wrote, “My ex-students and I formed a new group, StarLight. We are going to show the sky at schools with a little paper planetarium, which was created by an architect my friend. This is our presentation: ‘The most unintelligible thing about the universe is that it is intelligible.’ (Albert Einstein).

‘Discovering the unintelligible... from a tiny ‘hand-held planetarium’ to the immense ‘universe around us’—this is what StarLight aims to do. The group, made up of members of the former working team at the Ignazio Danti Planetarium until the end of the 2012-13 school year, has now branched out on its own, with activities for schools and the general public alike—activities which are the fruit of numerous years’ experience by teachers, planetarists and laboratory technicians in the field of astronomy. Formal lessons and practical sessions will take place in schools, while conferences, lectures and observations for the public will be held in different venues. StarLight will be also offer a maximum of three scientific tours a year.”

The StarLight website is under construction. For more information contact Simonetta at mirust7678@gmail.com.

**And we have a winner!**

Dave Weinrich, our IPS past president, is this year’s winner of An Experience in Italy for an American Planetarium Operator. Dave will be traveling to Italy in April 2014 to make presentations, in English, for Italian students, teachers and the public.

We all know about the wonderful work he has done as IPS president in Ghana, Liberia and Sri Lanka. He believes passionately in the benefits of international collaboration. He continues to serve his local community as well, as planetarium director at Minnesota State University-Moorhead, and will bring back some excellent new tips and tricks to enhance his teaching there.

Congratulations, Dave! (Dave mentioned that he would like to initiate a reverse exchange in the USA. This is a great idea. Anyone wishing to work with Dave can contact him at: davel.weinrich@gmail.com)

The revised contest rules: September 15 is the yearly deadline for the applicants of An Experience in Italy for an American Planetarium Operator.

**Application Procedure:**

Participants must send an application that includes full name, complete address, year of birth and curriculum vitae. Send this information along with a cover letter expressing why you wish to be considered for this experience.

You must also include the text of three lessons (or variations of the same lesson), with activities and stories, which you would like to present, (1) for students, (2) for teachers and (3) the public.

Please include a list of specialized vocabulary or any other relevant materials that you feel would strengthen your application. Before applying it would be wise to consult some of the previous winners to ascertain the best approach.

Send your application to: Loris Ramponi, Osservatorio Serafino Zani, Via Bosca 24, 25066 Lumezzane, Italy, or you can email it to Loris at: osservatorio@serafinoxani.it or megrez58@gmail.com.

Don’t forget, there are other opportunities: August 31 is the yearly deadline for the applicants of An experience in Italy for a French Planetarium Operator.

September 30 is the yearly deadline for the applicants of An Experience in Italy for a British Planetarium Operator.
Discover the Legend Written in the Stars...

LAMPS OF ATLANTIS

NARRATED BY
TERRY O’QUINN

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How to Build A Habitable Planet: The Story of Earth from the Big Bang to Humankind

Reviewed by Bruce L. Dietrich, Wyoming, Pennsylvania, USA.

It is estimated that our galaxy contains at least as many planets as stars. For some of us, finding Earth analogs, more popularly known as Goldilocks planets, holds tremendous fascination.

When this truly massive tome arrived, I was both challenged and amused by its title. Could it be a reprint of some ancient six-day construction manual? Or, more likely, a comparative table of specifications for our “control” planet?

Of course, it is neither. Rather, it is the comprehensive history of Earth from cosmic dawn to the ascendance of human civilization. This edition is the product of the apparently seamless collaboration between Charles H. Langmuir and Wally Broecker.

In 1984, Eldigo Press published a first edition written by the grandfather of climate science, Wally (Wallace S.) Broecker. Dr. Broecker’s studies of the biogeochemical cycles of carbon and their influence on climate change earned him the National Medal of Science. Currently he is professor of geochemistry at Harvard University and a fellow of the American Academy of Arts and Sciences.

Dr. Charles H. Langmuir has discovered hydrothermal sites in three oceans while on research cruises over the past 20 years. His distinguished career has made him a pioneer in solid earth geochemical cycle research. He recently co-led the first investigation of the Arctic Ocean ridge system. He, too, is a fellow of the American Academy of Arts and Sciences and a professor at Harvard University.

How To Build A Habitable Planet includes all the tools to make reading it a pleasure. Acronyms are well defined, an extensive glossary, appropriate end notes, related references, and an excellent index, indeed all the hallmarks of a Princeton University Press publication, are here.

This book is a substantive primer for the literate non-scientist or, indeed, for anyone seeking a general updating in astronomy, biology, chemistry, or geology, especially in relation to friendly exo-planets. I found in it the elements of an accurate, reasoned, useful, non-pejorative action plan for humanity.

Earth Dynamics: Deformation and Oscillations of the Rotating Earth
Reviewed by Woodrow W. Grizzle III, Elizabeth City State University Planetarium, Elizabeth City, North Carolina, USA.

Earth Dynamics is a scholarly work. Anyone looking for back porch leisure reading should steer clear of this book. Saying that, people who have a strong background in differential equations and a foundational understanding of the more advanced nature of our planet’s motions will enjoy what Smylie has to say.

This work deals with internal dynamic processes arising from the fluid nature of Earth’s mantle and core, mobile tectonic plates and rapidly changing atmosphere, as well as external forces rendered through the gravitation of the sun, moon and planets, which, together, exert forces upon Earth that displace its mass, thereby affecting its shape, rotation, magnetic field and gravity well.

Smylie’s work is based upon open source computer code, which has been made available for peers and students to explore his theories. The book’s companion website can be accessed at www.cambridge.org/smylie.

The work makes extensive use of scalars, vectors and tensors. Elementary results of vector analysis are summarized in an appendix in the back of the book. A prior working knowledge of physics is helpful before diving into this book.

Smylie’s writing is easy to follow with this prior knowledge, and having the software available from the website makes it easy to verify his work. Of particular interest to the planetarian is the fourth chapter, Earth’s Rotation: Observations and Theory, which deals with reference frames, polar motion and wobble and their dynamics, and nutation and the motion of the celestial pole.

Throughout the book Smylie’s writing is clear and well organized. His formulae are straightforward. This book would be a sound foundation for a graduate level course on terrestrial dynamics.

While this book is not light reading, it provides a welcome challenge to those of us who enjoy a bit more meat in our science reading. If you are a person who has a strong background in higher mathematics and physics, then you might enjoy this scholarly tome. If you are looking for an interpretive work, then you should skip it.

Mission: Mars
Pascal Lee, Scholastic, 2013.
Reviewed by Edna DeVore, SETI Institute, Mountain View California, USA.

Mission: Mars is a colorful introduction to Mars and space exploration designed as training manual for future space explorers, and was released to Scholastic Reading Clubs in September 2013 and to bookstores internationally on 1 November 2013.

The author, Dr. Pascal Lee, leads the training with easy to understand explanations and obvious enthusiasm. Stage one begins with a basic introduction to Mars and the solar system. Stage two includes practicing on Earth at Mars-analog sites and preparing for launch.

Stage three takes children to space and provides detailed images and information on spacecraft and navigation requirements, plus (Continues on Page 82)
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.

150+ theaters worldwide, 20+ languages, millions of viewers
Based on the hit TV series, The Zula Patrol™, now reaching 300 million households worldwide.
Target audience: ages 4-9, and families

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.
Rudolf Straubel, continued from Page 54

be gained by optically projecting the pictures of the heavenly bodies on the interior surface of the sphere. In this case all the complicated mechanical machinery could be replaced by a fairly small arrangement of optical apparatus in the midst of the sphere."

Immediately after I had spoken these words, my colleague in the Board of Management, Professor Straubel, who also had attended the meeting, exclaimed: "Then of course, also the fixed stars should be projected from the central apparatus." This was the moment in which the Zeiss-Planetarium was born. Oskar von Miller and all members of the meeting were very happy about this solution which, moreover, allowed enlargement of the dimensions of the spherical dome so that many more visitors could see the artificial sky simultaneously, and the astronomical department was charged with designing the apparatus in this form." (3 Bauersfeld p. 75)

We will discuss the Bauersfeld article and particularly the "birth moment" in a separate section below.

When informed by Dr. Fuchs about the new design idea for the Ptolemaic planetarium, Oskar von Miller was very pleased. In a letter dated March 20, 1914 he reflected on the new design. Beginning in April, he personally travelled to Jena, and upon his return to Munich, in a letter dated April 6, 1914, he summed up his discussions in Jena with an endorsement of the new plans. (9 Fuchs p. 61)

Projection planetarium: From concept to reality

After this endorsement of the new plans by von Miller, the actual work on the planetariums began at Zeiss. But because World War I broke out less than four months later, on July 28, 1914, the preoccupation with war production at Zeiss slowed the work on the planetariums down to a crawl. Nevertheless, the cooperation continued.

Chief engineer Meyer was put in charge of the actual work on the planetariums and on occasion was sent to Munich, to take part in discussions and decisions concerning the building of the domes where the Zeiss planetariums and the Zeiss telescope were to be housed. (9 Fuchs pp. 47-48)

The correspondence between Zeiss and the museum also continued. Letters from the museum to Zeiss usually are addressed to "Prof. Dr. Straubel, Direktor der Zeisswerke." Letters from Zeiss to the museum typically are signed by Dr. Walter Villiger, now head of the astronomy department at Zeiss, though some of them additionally show Straubel's initials ("St"). (1 Archive DM)

Despite the war, von Miller continued to push for advancement of the projects. The museum archive contains the proceedings of a meeting at Zeiss in Jena on July 7, 1917. Present were Prof. Straubel, Dr. Bauersfeld, Wieland, Becker (all Zeiss), and Oskar von Miller (DM). On the agenda were the current state of the work on the planetarium projects, and planning of detailed steps to advance the projects.

Franz Meyer was unable to attend the meeting, but was sent to Munich shortly thereafter to continue the discussions on site. (1 written report, Archive DM)

Work on projector can resume

After the end of World War I on November 11, 1918, following the end of war production and amidst a considerably decrease in civilian production at Zeiss due to a sharp decrease in exports, the work on the planetariums could now be resumed with increased effort.

The next event of crucial significance occurred in March 1919. Franz Meyer, who was then in charge of the project, had prepared a letter to the museum, dated March 21, 1919, in which he suggested abandonment of the projection of the fixed stars due to what he believed to be insurmountable difficulties, and to return to the original mechanical design of a rotating metal sphere.

His proposed change did not affect projection of the planets, sun and moon.

Bauersfeld, who found this letter on his desk for approval, intercepted it and prevented it from being sent. (17 Ludwig Meier pp. 91-92)

According to Bauersfeld himself, on March 24, 1919, just three days after finding Franz Meyer's letter, he proposed a solution for the difficulties encountered by Meyer of projecting the stars. In addition, he now took over from Franz Meyer the task of designing and building the Ptolemaic planetarium projector.

The following comment, dated September 29, 1942, and signed "Bfd" for Bauersfeld, was found handwritten on the side of a typed copy of Meyer's letter: "This letter was routed to me by the author before it could be mailed; therefore I was able to prevent it from being sent. It gave me reason to take on myself the construction of the projection planetarium since I was no longer convinced that the projection idea which originated with me could be realized without my continual assistance." (17 Meier pp. 91-92)

The events of March 1919, and the following stages in the construction of the apparatus, have been described by others, especially in much historical and technical detail by Ludwig Meier. (17 Meier) Therefore, we only mention the main events from here on.

Franz Meyer continued work on the Copernican planetarium, while Walther Bauersfeld was now in charge of the projection planetarium. On October 17, 1922, Zeiss sent in the patent request for the planetarium projector. From July to September 1923, trial runs of the new device were performed in Jena, in a dome constructed on top of a Zeiss factory roof.

Significant participation by Bauersfeld in the correspondence with the Deutsches Museum started on September 17, 1923, following von Miller's request to have the projector shipped to Munich for demonstrations to the Mars Project at NASA Ames Research Center in California. Each summer he leads research teams that explore Devon Island, a Mars-analog site in the Canadian Arctic, only a 1,000 miles from the north pole. A key site is the Haughton Crater, an impact crater that's like Mars on Earth!

Lee's short biography appears on the book. He's a planetary scientist, explorer, helicopter pilot, and flight instructor. Lee is an exciting scientist that inspires children.

Mission: Mars is ready-made introduction to Mars and space exploration for students in grades 4-6 (ages 10-12) and teachers. This handbook could complement planetarium programs on the solar system and human space exploration, serving as an extension of student and family experiences at the science center or planetarium.

Mission: Mars has a companion website that offers videos of Lee, a peek inside the book, and a downloadable teaching guide linked to the Common Core State Standards: www.scholastic.com/missionmars.
In his 1955 article “Aufbau der Astronomie im Deutschen Museum,” Franz Fuchs, a long-term division chairman there, mentions Straubel only once (12 Fuchs p. 59), with these words: “Despite the previous rejection by Zeiss, on Oct. 3, 1913 von Miller thoroughly discussed this matter which he felt so strongly about with Prof. Straubel who was a member of Zeiss management.” (Note that the correct date of the discussion was September 30, 1913)

Given the consistently courteous and reverent attitude towards Straubel found in the museum’s correspondence, the lack of Straubel’s mention by Fuchs appears surprising. In his article, photos are included of the signatures of Zeiss management members Czapski (9 p. 32) and Bauersfeld (9 p. 63), but Straubel’s signature is not shown.

Furthermore, the singular statement shown above seems quite curt. Fuchs mentions Straubel’s membership on Zeiss’s board of management, but omits his role as scientific director of Zeiss. This is all the more astonishing since Fuchs was von Miller’s right-hand man, from 1904 throughout the entire period of the planetarium projects and beyond.

Straubel’s donation of the Zeiss telescope for the observatory, his significance in Zeiss taking on the planetarium projects, and his membership in the presidium board of the museum all must have been known to Fuchs. In fact, Fuchs must have had personal contact with Straubel on various occasions, such as at the crucial meeting on February 24, 1914 in Jena. In light of these facts, Fuchs appears to show a decided reluctance towards mentioning Straubel by name.

Fuchs’s intimate familiarity with the history of the development of the Deutsches Museum, particularly with its astronomy department, is the reason why his article from 1955 has been so widely used as a key reference in the history of the projection planetarium, and rightfully so.

In turn, Fuchs’s lack of mentioning Straubel could help to explain why Straubel’s contribution to the planetariums has not been recognized in so many other accounts. The fact that Fuchs does not directly mention that Straubel was present at the annual meeting in 1913, for example, caused planetarium historian Ludwig Meier to invent a fictional telephone conversation between von Miller and Straubel, and to mainly credit von Miller’s irresistible persuasiveness with Zeiss’s acceptance of the planetarium projects. (17 Meier pp. 85-86)

Although it is not known with certainty why Fuchs did not give Straubel the warranted credit for his contributions, we will offer a possible explanation at the end of this article. Fortunately, the archive at the Deutsches Museum has the documents to complement Fuchs’s otherwise excellent historical account of the planetarium history with accounts crediting Straubel’s contribution.

Will continue in the next issue.

References

1 Archive, Deutsches Museum, München. If not indicated otherwise, documents are from the folders “Korrespondenz Astronomie” or “Allgemeine Korrespondenz.”
8 Email communications to the author from Dr. Röschner and Dr. Füßl, Archive, Deutsches Museum.
10Gale International Directory of Company Histories: “Carl Zeiss AG.”
14Julius Rosenwald correspondence, Museum of Science and Industry (MSI) Archives, Chicago.
Getting tactile with moon craters

Dr. David Hurd, professor of Geosciences and planetarium director at Edinboro (Pennsylvania) University, was invited by NASA to attend the launch of the Lunar Atmosphere and Dust Environment Explorer (LADEE) on September 6 at Goddard Space Flight Center’s Wallops Flight Facility in Wallops Island, Virginia.

He attended public events leading up to the launch to help enlighten the public on the mission as well as share copies of his tactile book, Getting a Feel for Lunar Craters. Written by Hurd with support from NASA’s Lunar Science Institute, Getting a Feel for Lunar Craters is a primer on lunar cratering designed for blind and visually impaired students.

Hurd has dedicated the last 15 years to producing and implementing tactile astronomy materials for the blind and has facilitated workshops on teaching astronomy to the visually impaired. He has produced products for NASA that have helped bridge the gap between the research community and special needs students.

Using ultraviolet and visible light spectrometers, the LADEE satellite is orbiting the moon to determine the composition of the lunar atmosphere.

Live-action fulldome in 5k

Beyond the Arctic Circle is a live-action fulldome film specially created for the fulldome medium; it will give viewers a chance to experience the nature and wildlife of the Arctic regions with an unprecedented sense of immersive presence.

The film was created with camera technology developed by Benjamin River Productions that allows production of a high resolution, live-action image for fulldome theatres. Company officials say that it already allows spherical, clean, live-action images with a native resolution of 5000 x 5000 px and enough flexibility for cinematic techniques.

Beyond the Arctic Circle is a story about a journey to the North in search of a special fox told through the eyes of a grandfather to his grandson. The film is 20 min in length and is intended for all audiences.

For more information, contact Gajane Katschjan, producer, at Benjamin River Productions. gajane@benjaminriver.com

Somehow, Someday

From author Avis Lang: If you were asked whether humans will have colonized space by the year 2500, chances are you’d say yes. But in light of current realities, political and otherwise, how might that goal be achieved?

In this wide-ranging essay, Avis Lang, Neil deGrasse Tyson’s longtime editor investigates the present state and long-term possibilities of spacefaring—encouragements versus impediments, competition versus cooperation—with reference not only to the United States but to humanity as a whole. Somehow, Someday is both for nonscientists who would like to get a quick but substantive overview of space issues and for scientists interested in policy and public awareness. Check for it online.

Celebrate the universe


Jim says that “Of my 9 previous books and star atlases, I consider this to be the most important. It emphasizes the aesthetics of leisurely stargazing and attempts to put the soul back into viewing the night sky—something sadly lacking today. An astronomy author, speaker, and consultant who has published nearly 1,000 articles and 10 books on observing the wonders of the heavens, Jim has logged over 20,000 hours of stargazing time with the unaided eye, binoculars and telescopes. Formerly curator of the Buhl Planetarium & Institute of Popular Science in Pittsburgh, Pennsylvania and director of the DuPont Planetarium at the University of South Carolina-Aiken, he served as staff astronomer at the University of Pittsburgh’s Allegheny Observatory and as an editor for Sky & Telescope magazine.

Staff changes at Thinktank

Mario Di Maggio reports that he was made redundant as manager of Thinktank Planetarium, Birmingham, West Midlands, England, and is now running Immersive Theatres (www.immersive-theatres.com). Mario has also re-launched Dome Club at a local arts centre (www.domeclub.co.uk).

Zee Dinally also was made redundant as Thinktank Planetarium presenter and has taken up the post of planetarium outreach officer at the Winchester Science Centre and Planetarium in Hampshire (formerly known as the INTECH Science Centre.)

And at Ott Planetarium

Ron Proctor, production coordinator for the Ott Planetarium at Weber State University, Ogden, Utah, has been laid off due to budget deficits.

His wife, AmyJo Proctor, remains as assistant planetarium director.

In a recent Dome-L post, Ron points out that he now has free time to help with full-dome video and Science on a Sphere needs.

Also acknowledged as one of the wizards of Blender, the open-source modeling software, Ron offered Blender training to planetarians at Ott State for a number of years. The full-dome products of the workshops were offered at no charge to the planetarium community.

He notes that he also is available now for on-site Blender training.

For more information about his abilities, go to physicsfoundry.com.

School dome closes—again

Garland Independent School District planetarium located in Lakeview Centennial High School (Garland, Texas) has been closed for at least the second time in three years.

The decision came from the school administration in early August. SWAP President Levent Gurdemir reports that “longtime director of the facility, Wilgus Burton, will continue to teach at the school with no access to a planetarium.”

The Garland ISD Planetarium opened in 1976 and housed a SpitzS12 star projector under its 9.14-meters dome. It was closed previously at the end of the school year in 2011.

(Continues on Page 86)
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It is with great sorrow that I report the passing of Gary J. Meibaum on October 7. Gary was a native of New Orleans, Louisiana, and grew up with a keen interest in astronomy, getting his first telescope at the age of 8. According to Gary, it was a 3-inch Newtonian with a “ball and socket” mount. His fascination with the heavens never ceased.

He graduated from the University of New Orleans in 1972 with a degree in engineering and worked for a time as regional service and technical manager for the South Central Region of the Heath Company of Benton Harbor, Michigan, a producer of electronic kits for the public.

He volunteered at the St. Mary's Dominican College Planetarium in New Orleans for a number of years, and that led to a three-year term as planetarium director at the 30-ft domed facility. That planetarium was later moved to the Louisiana Nature and Science Center. Gary was instrumental in the re-installation of this planetarium.

Gary also began volunteering at the St. Charles Parish Library's Planetarium in Luling, and, when the position of director became open in 1984, he filled the position and, as he put it, "left his electronic endeavors for the stars." After 17 years of nursing an aging Viewlex Apollo, Gary had the opportunity to remake the planetarium into a digital star theater, the first in the state, and one of the first full-color, fulldome digital planetariums in the Southeast.

Gary took to making fulldome shows like a duck to water, even after poor health forced a reluctant retirement. Jason Talley, who was Gary's planetarium assistant of seven years, took over as the planetarium's director. Gary couldn't have been happier with the choice of his successor. As Jason told me, "Gary was more than a mentor, he was a friend and a father figure to me."

I will miss exploring the culinary arts of the Big Easy with Gary as my guide. He loved New Orleans' restaurants and always knew the best places to eat. Many were "off-the-beaten-path", and like Gary, a treasure to be discovered. I am sorry that more of my fellow planetarians didn't get chance to know him better. Gary once wrote, "My most pleasurable activity is watching the beautifully-colored leaves fall under a 'Kodachrome Blue' sky." It seems only fitting that Gary passed away peacefully on such a fall day.

Submitted by Philip Groce

Gary J. Meibaum

Astronomy Society (1980), and recipient of the 2004 Paul Campbell Fellowship Award, Southeastern Planetarium Association.

These few words do not begin to express the impact Gary had on many planetarians over the last 25 years. He was as generous with his time as he was jovial. For most of us, he was a reminder that kindness is a better legacy than any planetarium accomplishment. He always made sure that the rest of us in the planetarium business never believed our own press. He once told me that sometimes planetarians take their role too seriously: "after all we don't own the stars, we just get to borrow them every night."

Gary was a native of New Orleans, Louisiana, and grew up with a keen interest in astronomy, getting his first telescope at the age of 8. According to Gary, it was a 3-inch Newtonian with a “ball and socket” mount. His fascination with the heavens never ceased.

He graduated from the University of New Orleans in 1972 with a degree in engineering and worked for a time as regional service and technical manager for the South Central Region of the Heath Company of Benton Harbor, Michigan, a producer of electronic kits for the public. His fascination with the heavens never ceased.

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2013


18-19 February. The Australasian Planetarium Society (APS), Meeting 2014. Melbourne Planetarium, Australia. Contact: Lawrence Warik, lwarwice@museum.vic.gov.au, apsplanetarium.com


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.technopolis.be

24-25 March. Giant Screen Cinema Association, GSCA 2014 Film Expo, Austin, Texas, USA. Contact: Tammy Seldon, tammy@giantsscreencinema.com, www.giantscreencinema.com

31 March. Deadline for application for scholarship funds (IPS support Beijing Conference attendance by individuals). www.ips-planetarium.org

12-13 April. Italian Association of Planetaria (PlanIt), XXIX National Conference, Italy, and 4th Full-Dome Italian Festival. During the conference Skype session for planetarians from other countries. www.planetari.org Contact: osservatorio@serafinozani.it

1-5 May. Three languages-The same sky, Symposium of Planetariums 2014 Lucerne, Switzerland. Association des Planetariums de Langue Française (APLF); Gesellschaft Deutschsprachiger Planetarien e.V. (GDP); Associazione dei Planetari Italiani (PlanIt). Organizer: Swiss Museum of Transport. Contact person: daniel.schlup@verkehrshaus.ch.


8-10 May (subject to change). Canadian Association of Science Centres (CASC), Annual Conference, Planetarium Rio Tinto Alcan, Montreal, Quebec, Canada. The planetarium will be assisted by three sister organizations in Montreal: Montreal Science Centre, Biodome and Insectarium. Contact: ianmcclennan.com, www.canadiansciencecentres.ca/main.htm

21-24 May. 8th FullDome Festival at the Jena Zeiss-Planetarium, “Ahead in the curve!” Jena, Germany. Contact: info@fulldome-festival.de or Schorcht Volkmar, schorcht@zeiss.de; www.fulldome-festival.de

22-24 May. ECSITE Annual Conference (European Network of Science Centres and Museums), Museum, The Hague, Netherlands. www.ecsite.eu


23-27 June. 22nd International Planetarium Society Conference, Beijing Planetarium, China. www.ips2014.org, contact mail Dr. Zhu Jin, jinzhu@bjp.org.cn

15-19 July. Southeastern Planetarium Association, SEPA 2014 Annual Conference, Buehler Planetarium at Senoimie State College, Sanford, Florida, USA. Contact: Michael McConville, mccconvillem@seminolestate.edu, www.sepadomes.org

31 August. Deadline for the applicants of “An experience in Italy for a French-Speaking Planetarium Operator,” in collaboration with APLF. www.astrofilibresciani.it/Planetari/Wek_in_Italy/Week_Italy.htm

10-13 September. Middle Atlantic Planetarium Society, Annual Conference, Maryland Science Center’s Davis Planetarium, Baltimore, Maryland, USA. Contact: Patty Seaton, pxts13@yahoo.com; www.mapsplanetarium.org

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/Planetari/Wek_in_Italy/Week_Italy.htm

1-5 October. XIV Meeting of the Association of Brazilian Planetariums (ABP), Goiânia and Anápolis Planetariums, Goiás State, Brazil. Contact: contato@planetairos.org.br, www.planetarios.org.br


29 October-November 1. Great Lakes Planetarium Association, GLPA Conference, Ball State University Planetarium, Department of Physics & Astronomy, Muncie, Indiana, USA. Contact: rkaitchu@bsu.edu, www.glpaweb.org

2014-International Year of Crystallography


9-11 March. ECSITE Annual Conference (European Network of Science Centres and Museums), Museon, The Hague, Netherlands. www.ecsite.eu

2015-International Year of Light


3-4 August. International Astronomical Union, XXIX General Assembly, Hawai’i Convention Center, Honolulu, Hawaii, USA. astronomy2015.org

29 October-November 1. Great Lakes Planetarium Association, GLPA Conference, Ball State University Planetarium, Department of Physics & Astronomy, Muncie, Indiana, USA. Contact: rkaitchu@bsu.edu, www.glpaweb.org

For corrections and new information for the Calendar of Events, please send a message to Loris Ramponi at osservatorio@serafinozani.it
More details about several of these upcoming events is included in the International News column in this issue. The most up-to-date information also is available online at the IPS Calendar of Events at www.ips-planetarium.org/?page=calendar
We have a guest in the Last Light space for this issue. Tony Darnell is an astronomy software technologist at the Space Telescope Science Institute in Baltimore, Maryland, with a bizarre desire to communicate ideas about how small we are. He was kind enough to share a recent piece from his DeepAstronomy Blog (www.deepastronomy.com). This one is titled “The Redneck Astronomer.”

This all took place on the last day of our 5-day fishing trip to catch redfish in the Mosquito Lagoon, a region of water immediately north of the Kennedy Space Center. We had spent all morning (since about 4 a.m.) fishing. It was stifling hot, muggy, and we didn’t catch a thing.

On the last day, I wanted to go to the Space Center. I was tired of looking at the Space Shuttle on the launch pad from the boat, I wanted to get closer. Besides, I hadn’t been there since the 70’s when my parents took me there for my birthday one year, and I had great memories of it. I wanted my kids to see it too.

So we packed up our stuff at about noon, got the boat out of the water, and went to Titusville.

I want you to visualize this.

We had just come off a boat where we spent all morning taking catfish and trout—that were-too-small off of hooks, handling shrimp and small mullet for bait, and sweating like proverbial pigs. To say we were “ripe” would be an understatement. Trees wilted as we drove by and the alligators shook their heads and made snorting sounds as we passed. I think a couple of seagulls fell out of the sky.

We pulled up into the Kennedy Space Center parking lot in a pickup truck with CB antennas sticking up, guns in a gun rack (they were my Dad’s), pulling a boat full of fishing gear.

The Clampetts do Kennedy

It felt like going to Disney World with the Clampetts (from the Beverley Hillbillies television program, an American situation comedy from 1962-1971). All that was missing was guns shooting in the air and a Jethro Bodine “YEEEEHAAWWW!” when we pulled up.

The feeling was so surreal: my redneck world had crashed into a world where space travel was common, the gateway to the universe: Kennedy Space Center.

OK, so the first problem was parking. After we found a spot for the truck and boat (we parked by all the gigantic RV’s), and stowed all the valuable hunting and fishing gear, we get on the Tramway to the ticket area. (“Remember kids, we parked in ‘Buzz Aldrin,’ row S.”)

Not surprisingly, we had the entire bench to ourselves. A rather attractive tourist about three rows up kept waving her hand in front of her face. Others were checking the bottoms of their shoes.

For those of you who’ve never been to the Kennedy Space Center, let me just say that you had better be prepared to take out a small loan to get in. Tickets for the four of us cost around $200.00!

My Dad, God bless him, didn’t flinch. When I tried to pay he said, “Put your money away, boy. You ain’t too old for me to kick your a** you know.” My heritage is a proud one.

So, after we got our tickets, next was security. My Dad had neglected to leave his big-a** (and I mean BIG-A**) knife in the truck. It was this big, hairy looking knife with killer jagged edges. Needless to say, security wouldn’t let him through.

So we trekked all the way back to the truck to put the knife away (we walked to spare the pleasant-smelling tourists this time), then turned and went inside.

Now we found ourselves with tourists from all over the world, looking like we just got off the... well... boat.

We had a great time. My favorite part was the Apollo Saturn V area. The kids couldn’t believe how large it was.

I had stared at it on TV, I had posters of it in my room I built plastic models of it, and I even launched a 1/50th scale model. I dreamt about that rocket and was inspired by what it meant. I wanted to BE in that rocket. Immediately, all of those hours sitting in front of the TV as a kid came flooding back. I have probably stared at the Saturn V rocket more than anything else in my life, except perhaps into the eyepiece of my telescope.

Now that’s a good movie

Next we saw the most amazing IMAX movie I have ever seen, Magnificent Desolation. It was probably the best movie of any kind that I have ever seen (even better than Lord of the Rings). I left that theatre feeling as if I had just gone to the moon. I actually cried, I’m not kidding. The effects were amazing and the re-enactment sequence where the 3-D camera is behind the astronauts as they land the lunar lander on the moon really got me. It really felt as if I was standing behind Neil Armstrong and Buzz Aldrin as they landed the Eagle. I was a kid in 1969 living my dream.

A smelly, puddy, redneck astronomer with tears streaming down his face wearing 3D glasses is not a pretty sight. My boys asked if I would please walk a few paces behind them as we exited the theatre.

Our last stop was the Liberty Bell exhibit. The actual capsule that Gus Grissom flew in during the Mercury program has been salvaged and was on display at KSC. “Oh man, are you kidding me?” I was in heaven. This exhibit had artifacts from the time in my life when my strongest memories about becoming an astronaut were born and led to my becoming an astronaut. The 1960’s and 1970’s were a powerful time for me: the dreams of my life were being cast. While I was only about 8 when Armstrong landed on the moon, I had a

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