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Executive Editor
John Mosley
639 N. Burr Sage Trail
Kayenta, Utah 84738 USA
planetarianeditor@mac.com
(1) 435-773-7870

Advertising Coordinator
Chuck Bueter
15893 Asheville Lane
Granger, Indiana 46530 USA
(1) 574-271-3150
bueter@rad-inc.com
http://www.ips-planetarium.org/planetarian/
ratesheet4.htm

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Cover: School children and their teacher sit beneath
the Canton Planetarium dome on the campus of Kent
State University in Canton, Ohio, in 1950. The dome
was a grain silo. Richard Emmons and his students con-
structed the planetarium in his classroom at a cost of
$100 and presented shows to about 1500 young people
from the Canton Public Schools and Kent State Uni-

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April S. Whitt
Vacant
I. P. S. Officers

President
Martin George
Launceston Planetarium
Queen Victoria Museum
Wellington Street
Launceston, Tasmania 7250 Australia
61 3 6323 6776
61 3 6323 6776 fax
Martin.George@qvmag.tas.gov.au

Past President
Jon W. Elvert, Director
Irene W. Pennington
Planetary
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana 70802 USA
(1) 225-344-5272
(1) 225-214-4027 fax
jevelvert@lasm.org

Executive Secretary
Lee Ann Hennig
Planetarium

(1) 315-432-4523 (fax)
sbutton@ocmboces.org

Thomas Jefferson High School
for Science and Technology
6660 Braddock Road
Arlington, Virginia 22312 USA
(1) 703-750-8380
(1) 703-750-5030 fax
lhenning@earthlink.net

Treasurer and Membership Chair
Shawn Laatsch
P.O. Box 1812
Greenville, North Carolina 27835 USA
(1) 252-328-9371 fax
laatschs@mail.ecu.edu

I. P. S. Affiliate Representatives

Association of Dutch Speaking Planetariums
Chris Janssen
Director, Europlanetarium
Planetariumweg 19
3600 Genk Belgium
+32 99 30 79 90
+32 99 30 79 91 fax
christ.janssen@pandora.be
www.europlanetarium.com

Association of French-Speaking Planetariums
Agnes Acker
Observatoire de Strasbourg
21, rue de l’universite
67000 Strasbourg France
03 90 24 24 67
03 90 24 24 17 fax
ACKEra@ol.com
acker@astro.ru-strasbourg.fr

Association of Mexican Planetariums
Ignacio Castro Final
Torres de Mixcoac, A6-702
C.P. 04190, México D.F. México
(+52) (55) 24 31 30 Fax
icastro@hotmail.com

Association of Spanish Planetariums
Javier Armentia
Planetario de Pamplona
Sancho Barrio, 2
E-31008 Pamplona Navarra Spain
+34 948 260 004
+34 948 260 066
+34 948 261 919 fax
javarm@pamploniotario.org
gestion@pamploniotario.infonegro-cio.com

Australian Planetarium Society
Martin Bush
Melbourne Planetarium
2 Booker Street
Spotswood. 3015
Victoria, Australia
+61 3 9243 4033
mbush@australian.vice.gov.au

British Association of Planetaria
Dr Tom Mason, Director
Armagh Planetarium
College Hill
Armagh. N Ireland
BT61 9DB
(+44) (0)2837 524725
(+44) (0)2837 526 153 fax
(+44) (0)771 103 3545 cell
www.armaghplanet.com
tomarmaghplanet.com
mason@btinternet.com

Canadian Association of Science Centres
John Dickinson, Managing Director
Pacific Space Centre
H.R. MacMillan Planetarium
1100 Chestnut Street
Vancouver, British Columbia V6J 3J9
Canada
(604) 738-7827 ext.234
(604) 736-5665 fax
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Chairman of Canadian Planetariums
Edwards Thomas
Mediendom
Kiel University of Applied Sciences
D-24194 Kiel
(+49) (0) 431 210 1721
(+49) (0) 431 210 61721 fax
edward.thomas@fh-kiel.de
medienkomunikation.de

Chairman of European Mediterranean Planetariums
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Eugenesid Planetsarium
Syngrou Avenue-Amfithea
Athens Greece
(30) 1 941 1181
(30) 1 941 372 fax
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Chairman of Great Lakes Planetarium Association
Chuck Bueter
15893 Ashville Lane
Granger, Indiana 46343 USA
(1) 574 271 3500
bueter@rad-inc.com

Chairman of Great Plains Planetarium Association
Jack Dunn
Ralph Mueller Planetarium
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210 Morrill Hall
Lincoln, Nebraska 68588-0375 USA
(1) 402-472-2641
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(39) 30 87 25 45 fax
www.planetariitaliani.it
info@serafinzani.it

Chairman of Japanese Planetariums
Shoichi Itoh
Planetarium Ur
Suginami Science Education Center
3-3-13 Shimbashi, Suginami-ku
Tokyo 167-0033 Japan
(81) 1 3396-4391
(81) 1 3396-4393 fax
KIF13056@nifty.ne.jp
shoitoh@h27.so.net.ne.jp

Chairman of Middle Atlantic Planetarium Society
Patty Seaton
H.B. Owens Science Center
9601 Greenselt Road
Landham-Seaobrk, Maryland 20706 USA
(1) 301-918-8750
(1) 301-918-8753 fax
pxts13@yaho.com
http://www.maps-planetarium.org

Chairman of Nordic Planetarium Association
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(46) 230 177
ljbr@du.se
www.planetarium.se/npa

Chairman of Pacific Planetarium Association
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Independence Planetarium
1776 Educational Park Drive
San Jose, California 95133 USA
(1) 408-926-9064
(1) 408-926-9353 fax
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Chairman of Southwestern Planetarium Association
Tony Butterfield
Houston Museum of Natural Science
One Hermann Circle Houston, Texas 77581 USA
(1) 713-639-4637
(1) 713-639-4681 fax
thbutterfield@hmns.org

Chairman of Ukrainian Planetariums
Lydila Rylko
Kiev Republican Planetarium
57/3 Velyka Vasylkivska Street
03150 Kiev Ukraine
(+380) 44 27 27 81
(+380) 44 27 37 43 fax
planetarium@znaninya.org.ua
I. P. S. Standing Committees

**IPS Awards Committee**
Jon Bell
Hallstrom Planetarium
Indian River Community College
3209 Virginia Avenue
Fort Pierce, Florida 34981 USA
(1) 561-462-4888
JBELL@rcc.cc.fl.us

**IPS Conference Committee**
Martin George
Launceston Planetarium
Queen Victoria Museum
Wollongong Street
Launceston, Tasmania 7250 Australia
61 3 63237776
61 3 63237777 fax
Martin.George@qvmag.tas.gov.au

**IPS Conference Host: 2006**
Dr. Tanya Hill, Curator
Melbourne Planetarium
Scienceworks/Museum of Victoria
2 Bookner Street
Spotswood, Victoria 3015 AUSTRALIA
+61 3 9392 4503 planetarium
+61 3 9392 4503 fax
+61 3 9392 4503 planetarium
+61 3 9392 1000 fax

**IPS Education Committee**
April Whitt
Fernbank Science Center
156 Heaton Park Drive NE
Atlanta, Georgia 30307 USA
(1) 678-875-7149
(1) 678-874-7110 fax
april.whitt@fernbank.edu

**IPS Full-Dome Video Committee**
Edward J. Lantz
Planetarium Consultant
Visual Bandwidth, Inc.
P.O. Box 1367
1290 Baltimore Pike, Suite 111
Chadds Ford, Pennsylvania 19317 USA
(1) 484-467-1267
(1) 610-358-1689 fax
ed@visualbandwidth.com
http://www.visualbandwidth.com

**IPS History Committee**
John Hare, IPS Historian
Ash Enterprises
3602 23rd Avenue West
Bradenton, Florida 34205 USA
(1) 941-746-3522
(1) 941-740-9497 fax
johhare@earthlink.net

**IPS Job Information Service Subcommittee**
(Professional Services Committee)
Steve Fentress
Strasenburgh Planetarium
Rochester Museum & Science Center
657 East Avenue
Rochester, New York 14607 USA
(1) 585-271-9500 ext. 409
(1) 585-271-7146 fax
steve_fentress@rmsc.org

**IPS Language Committee**
Martin George
Launceston Planetarium
Queen Victoria Museum
Wollongong Street
Launceston, Tasmania 7250 Australia
61 3 63233776
61 3 63233776 fax
Martin.George@qvmag.tas.gov.au

**IPS Media Distribution Committee**
Thomas W. Kraupe, Direktor
Planetarium Hamburg
Hindenburgstr.1b
D-22303 Hamburg
+49(0)140-428 85 52 50
+49(0)140-428 85 99 99 fax
+49(0)140-4279 24 850 432
+49(0)140-428 85 53 133 cell
thomas.kraupe@planetarium-hamburg.de
www.planetarium-hamburg.de

**IPS Outreach Committee**
Christine Shupla
Arizona Science Center
600 East Washington Street
Phoenix, Arizona 85004 USA
(1) 602-716-2078
(1) 602-716-2099 fax
shuplac@AZSCIENCE.org

**IPS Planetarium Development Group**
Ken Wilson
Ethyl Universe Planetarium
Science Museum of Virginia
2500 West Broad Street
Richmond, Virginia 23220 USA
(1) 804-864-1429
(1) 804-864-1560 fax
kwilson@smv.org

**IPS Portable Planetarium Committee**
Susan Reynolds Button
Quarks to Clusters
8793 Horseshoe Lane
Chittenango, NY 13037
(1) 315-687-5371
shutton@ocmboec.org

**IPS Professional Services Committee**
Mike Murray
Clark Planetarium
110 South 400 West
Salt Lake City, Utah 84101 USA
(1) 801-456-4949
(1) 801-456-4928 fax
mmurray@ccsci.ut.us

**IPS Script Content Committee**
Steve Tiley
58 Prince Avenue
Southend, Essex, SS2 6NN England
United Kingdom
stevetiley@hotmail.co.uk

thill@museum.vic.gov.au

**IPS Elections Committee**
Steve Mitch, Chair
Benedum Natural Science Center
Oglebay Park
Wheeling, West Virginia 26003 USA
(1) 304-243-4034
(1) 304-243-4110 fax
smitch@oglebay-resort.com

**IPS Finance Committee**
President, Past-President, President-Elect, Treasurer, Secretary
Shawn Laatsch
600 W. Kagy Blvd.
Bozeman, Montana 59717 USA
(1) 406-738-7827 ext. 234
(1) 406-736-5665 fax
jdickens@axion.net

**IPS Publications Committee**
Dr. Dale W. Smith
BGSU Planetarium, 104 Overman Hall
Bowling Green State University
Bowling Green, Ohio 43403 USA
(1) 419-372-8666
(1) 419-372-9938 fax
dsmith@newton.bgsu.edu

**IPS Permanent Mailing Address**
International Planetarium Society
c/o Taylor Planetarium
Museum of the Rockies
Montana State University
600 W. Kagy Blvd.
Bozeman, Montana 59717 USA

**IPS Web Site**
www.ips-planetarium.org

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Edward J. Lantz
Planetarium Consultant
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P.O. Box 1367
1290 Baltimore Pike, Suite 111
Chadds Ford, Pennsylvania 19317 USA
(1) 484-467-1267
(1) 610-358-1689 fax
ed@visualbandwidth.com
http://www.visualbandwidth.com

**IPS History Committee**
John Hare, IPS Historian
Ash Enterprises
3602 23rd Avenue West
Bradenton, Florida 34205 USA
(1) 941-746-3522
(1) 941-750-9497 fax
johhare@earthlink.net

**IPS Job Information Service Subcommittee**
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Steve Fentress
Strasenburgh Planetarium
Rochester Museum & Science Center
657 East Avenue
Rochester, New York 14607 USA
(1) 585-271-8522 ext. 409
(1) 585-271-7146 fax
steve_fentress@rmsc.org

**IPS Language Committee**
Martin George
Launceston Planetarium
Queen Victoria Museum
Wollongong Street
Launceston, Tasmania 7250 Australia
61 3 63233776
61 3 63233776 fax
Martin.George@qvmag.tas.gov.au

**IPS Media Distribution Committee**
Thomas W. Kraupe, Direktor
Planetarium Hamburg
Hindenburgstr.1b
D-22303 Hamburg
+49(0)140-428 85 52 50
+49(0)140-428 85 99 99 fax
+49(0)140-4279 24 850 432
+49(0)140-428 85 53 133 cell
thomas.kraupe@planetarium-hamburg.de
www.planetarium-hamburg.de

**IPS Outreach Committee**
Christine Shupla
Arizona Science Center
600 East Washington Street
Phoenix, Arizona 85004 USA
(1) 602-716-2078
(1) 602-716-2099 fax
shuplac@AZSCIENCE.org

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Ken Wilson
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2500 West Broad Street
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(1) 804-864-1429
(1) 804-864-1560 fax
kwilson@smv.org

**IPS Portable Planetarium Committee**
Susan Reynolds Button
Quarks to Clusters
8793 Horseshoe Lane
Chittenango, NY 13037
(1) 315-687-5371
shutton@ocmboec.org

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Mike Murray
Clark Planetarium
110 South 400 West
Salt Lake City, Utah 84101 USA
(1) 801-456-4949
(1) 801-456-4928 fax
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**IPS Permanent Mailing Address**
International Planetarium Society
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Museum of the Rockies
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600 W. Kagy Blvd.
Bozeman, Montana 59717 USA

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March 2006 Planetary 3
turn turned dry so far. Apparently people realize how much work this is! I’m told I’m needed by the IPS, and have been flattered into continuing to edit the March and June issues and possibly beyond.

The journal itself will remain the same, as will the production crew and the deadlines, but there will necessarily be changes in how material is submitted. After spending the spring in our new desert home in beautiful Southern Utah, Barbara and I plan to be on the road for over a year in a new recreational vehicle, and during that time I can accept physical mail only by advance arrangement to “General Delivery.” All material must be submitted electronically. Please see the Guidelines for Contributors (which I will update as necessary) at http://www.ips-planetarium.org/planetarian/guidelines.html.

My two former email addresses, jmosley@GriffithObs.org and jmosley@earthlink.net, are now history, both replaced with, simply planetarianeditor@mac.com. I’ll be connecting both at home and while on the road with a wi-fi card in my PowerBook laptop, and hopefully it will be fast enough to transfer graphics and advertisements.

I’d like to offer a belated welcome to Christopher Reed, the newest Associate Editor, whose column General Counsel apprises us of legal matters. Christopher has contributed occasional articles in the past, but now he appears on a regular basis. As our production budgets increase and shows become more elaborate, they’ll come under greater scrutiny, and it will be more important to understand the legal aspects of what we do. The stakes are rising.

We very much need an Associate Editor for What’s New. This is a wonderful opportunity for someone with energy and writing skills to make a significant contribution by keeping in touch with and describing new products and trends. Jim Manning did a great job for a long time, and his work is sorely missed. Who will step up to the plate?

The first issue of 1981 was dated simply “First Quarter” on the cover, without a year. Inside appeared “Publication date May 1981.” Long ago the Planetarian appeared at irregular intervals, but only older members of the IPS still remember those troubled days. This was even though there were two editors, an Executive Editor and a Publishing Director, in addition to a multitude of 13 Associate Editors!

With all this help it should have been a good issue, and it was. Its 44 pages (including the covers) were packed with material. There were six articles and nine “departments” (“columns” in current terminology) and no advertisements. Here are the highlights.

Gabriel Muñoz, then as well as now of Morelia, Mexico, led off with “The Planetarium as an Aid to the Study of Man and His Origin.” Gabriel’s independent research in local sky mythology led him to believe that the local Tarascan tribe originated in South America, rather than the Bering Strait. I wonder if his proposal has been accepted.

Elissa Hamilton of the Stevens Institute of Technology (location not specified) surveyed to find a relationship between the public’s view of the success of NASA and attendance at planetariums. A secondary goal was to learn the difference between people who attend planetariums and those who do not. 132 college students were sampled, and the results presented in five graphs and four tables (which equals one visual per 14,666 students sampled). I’ve re-read her article several times, but cannot find meaningful conclusions.

Jamie Jobb (location and affiliation unknown) discussed the importance of analogies in explaining concepts. She cautioned against the dangers of not recognizing incompatible elements in an analogy, as “If, for example, we tell young students that ‘the Earth is a spaceship,’ the children might conjure up ideas of the Earth being fired, having fuel, etc. We need to take time to point out the non-transferable elements — otherwise individuals may take away wrong ideas…”

Three pages of quick examples followed.

Roger Scott and Michael Smolek, Muncie, Indiana, described a 180° pinhole projector they constructed for less than $20 to fill the sky with galaxies, claiming that it “always produces lots of ‘oohs’ and ‘aahs’ from the audience” when fired up. Those were the days.

Douglas Johnson “refuted” the Mosley-Martin historical approach to the Star of Bethlehem, which had been published in the summer 1980 issue. He repeated the old historical arguments that Herod died in 4 B.C., but did not address the problems in the standard chronology that were the core of Ernest Martin’s thesis and book. The debate continues today.

In his Computer Corner, Dan Spence reproduced five pages of code that people could key into their Commodore Pet 2001 micro-computers and display the proper motions of key stars in several constellations. I would like to see a sample of the output.

James Brown in What’s New compared the new Singer Caramate 35mm slide projector to the familiar Kodak Ektographic. He much preferred the Caramate. (I still have one, somewhere.)

Seven pages were dedicated to printing the script to Roger Grossenbacher’s planetarium show “Name That Planet: A Wild and Crazy Introduction to the Solar System.” Two of the goals were “to be entertaining” and “to include as much up-to-date information on the planets as a half-hour show would allow.” It required 59 slides to present. The format is a radio quiz show hosted by “Dennis and Twink” who bombard call-in contestants with questions like “Most asteroids lie between the orbits of two planets. Name those two planets!” Bonk! See Tuukka Perhoniemi’s article in this issue for thoughts on alternative goals.

My favorite piece was hints on all-sky patterns using baby food jars. Yes – planetariums did once use baby food jars for special effects. Some were even all-dome effects!

As California’s “Governator” would say in previous acting roles, “I’m back!”

Despite my best efforts to retire from the Planetarian and from the Griffith Observatory, I’ve achieved only partial success. The search for a replacement Executive Editor has
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The Power of the Planetarium Theater:
40th Anniversary Conference Founders Lecture

Presented at the 2005 Great Lakes Planetarium Association Conference

Von Del Chamberlain
3583 Eastwood Dr.
Salt Lake City, Utah 84109 USA
von_del@lgcy.com

Abstract

A founding member of GLPA expresses appreciation for what GLPA members have accomplished in the four decades of the associations existence and relates an incident involved in the origin of GLPA. He expresses the belief that the planetarium is a medium with great learning power and that no medium has ever been created with greater power to inspire the intellect. The lecture is focused on the power of words and images and advises that we should use thoughtful discretion in both the language and images we employ under our star-domes.

It is such a pleasure to see what Great Lakes Planetarium Association members are doing, to see the association so healthy and vigorously pursuing excellence in the use of planetariums for educational entertainment.

I have been out of the mainstream of planetarium work for a decade now. I am overwhelmed to see how far planetarium technology has come in ten or so years. Things that had been talked about for many years before I retired have become stark reality, achieving spectacular quality.

It is good to be at the GLPA 40th anniversary conference with some old friends and so many new ones. You are some of the people I am most fond of in all the world. I appreciate having been invited to be among you and to provide a few thoughts that I hope might be of value as you enter your next decade of spraying stars onto domes, interjecting them into the minds of so many entering your theaters to learn about the great cosmos.

I thought you might be interested in knowing something about the very early origins of GLPA. When I was in my first professional job as Staff Astronomer at the Robert T. Longway Planetarium in Flint, Michigan, our director, Maurice Gene Moore, was invited to attend one of the meetings of the “Major Planetaria.” This was more like an international social club than it was a professional conference and one had to be invited in order to attend. Gene was proud that Longway had barely qualified for invitation, the primary criteria being size of the planetarium dome. He came back bubbling with the experience, reporting that there had been considerable discussion about small planetariums that were coming into existence. Apparently some at the meeting were quite concerned about what might happen if these “inferior” facilities continued to spread. One delegate was quoted to have said, “if we ignore them, perhaps they will go away.” It was clear that the “Big Dome” folks didn’t want to do anything to encourage this infestation, nor did they wish to help their smaller unwanted cousins achieve success. One director of a large American planetarium refused to accept appointments from small planetarium directors. He would not talk to them.

This situation seemed very strange to me. Surely the small facilities did not threaten the big ones in any way, and all planetariums, regardless of size, shared the common element of public education. As I thought about this I wondered why the large planetariums with their well qualified staffs would not want to assist the new tiny classrooms of the sky located in museums and schools.

So, to make a long story short, I thought that there was great need for planetarium personnel to get together and share common concerns, discoveries, successes and methodology. If the “Big Boys” did not want to do that, perhaps those assigned to apply smaller facilities for quality learning might want to do so.

While I was deliberating that unusual situation, I met David DeBruyn and Dennis Sunal and we found ourselves discussing the need for planetarians, as we were later called, to get together in a professional forum. One thing led to another and here we are forty years later in the 41st GLPA conference. It is such a pleasure to be here again with David, Dennis, and others who helped establish our association. If only more of those who played critical roles could be here as well.

I am pleased to say that, as far as I can tell, not a trace of the animosity that once existed between large and small domes has survived to this time.

Indeed, it is nice to see that representatives from large planetariums typically attend regional as well as IPS conferences right alongside their smaller siblings.

Now, at this conference, David DeBruyn has presented the Armand N. Spitz Lecture. In his insightful talk, Dave got us thinking about the lives we touch in our work. After hearing this, I made a quick guesstimate about the numbers of people GLPA members have touched during 40 years of planetarium education. I might be way off, but I think the number is somewhere around 200 million, perhaps more. Think about the significance of touching so many minds with the wisdom of the stars!

So, what wisdom, if any, can I share with you from my years as a planetarian? I have thought long and hard about this and have concluded that there are two points I want to make which I hope might be of value to you. Both of them have to do with the power that we have within our star theaters.

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Both points are very fundamental and you might easily guess what they are.

To begin, think back to the very first modern planetarium, more than eighty years ago. I want you to think about the very best trick we have ever used in planetariums which has been used as long as planetariums have been around. Imagine that you are sitting in a planetarium with pleasant evening music playing. The Sun sets in glorious hues and light of day fades. The stars are there, but dimly. Music rises to crescendo as the last bit of light dims away and the stars quickly brighten in all their splendor. Music dies with the quick intake of audience breath. Silence! A cool breeze wafts over you. Then words quietly play within your mind.

We ought to become wordsmiths. We have to be very careful how we use this power. We speak and write words. Therefore, we ought to use them sparingly. We should work hard to make words clearly portray meanings. Language is beautiful and the words we use should be arranged so that they portray meanings with beauty. It is important that we fill our theaters with the power of language to match the power of the images we also use there.

When we lived in a city
(Three flights up and down)
I never dreamed how many stars
Could show above a town.

When we moved to a village
Where lighted streets were few,
I thought I could see all the stars,
But oh I never knew —

Until we built a cabin
Where hills are high and far
I never knew how many
Many stars there really are!

The images of starry night created in your minds, enhanced by the words of Aileen Fisher, are, in my opinion, as good as it gets in any planetarium. Nothing is more powerful in any planetarium than the simulation of a country starry night. So, the two points I wish to make have to do with the power of words and the power of images. That is, isn’t it, what we do in our theaters? We project images and we speak words. Oh yes, we play music also, but that is generally designed to enhance the images and words.

WORDS: Powerful Language to Match Powerful Images

Our primary objective in using planetariums is to inspire and teach. Armando. Spitz once said that the most important item in any star theater is the teacher. The most powerful thing, then, is the person in the theater who speaks words. Words are symbols invented by humans for communication. Words are symbols of thought.

Those who read this will be familiar with the long history of speech and know that words are among the most powerful tools we have. Think about it! Nothing is more powerful for each of us than is the ability to speak and write words. Therefore, we ought to be very careful how we use this power. We ought to become wordsmiths. We should learn to use language most effectively. We ought to choose words with great care and use them sparingly. We should work hard to make words clearly portray meanings. Language is beautiful and the words we use should be arranged so that they portray meanings with beauty. It is important that we fill our theaters with the power of language to match the power of the images we also use there.

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While I applaud the immense data bank of images we have available, I hope we will carefully select and effectively use it to bring understanding while portraying beauty upon our domes. And let us not forget that, still, the single most significant set of images we have comes out of our star projectors.

“If the stars should appear one night in a thousand years, how would man believe and adore, and preserve for many generations the remembrance of the City of God which had been shown!” (Emerson)

Through my 45 years as a planetarian I have noticed that the human exultation of looking into a starlit night has not decreased. Indeed, it has increased. For the vast majority of humanity the dark starry country night is on the endangered list. Most people have never seen the Milky Way and will not see it any time during their lives. As the experience of seeing the stars in all their glory grows more rare at the very time when our knowledge about the cosmos is most extensive, the thrill of seeing the stars is ever greater. I think this observation – this fact – should remain in our uppermost awareness as we do our work. We must not forget it.

"No sight that human eyes can look upon is more provocative of awe than is the night sky scattered thick with stars."

Learning is the motivation for going to these conferences. It is why we gather. We relish what we learn and we enjoy using it, sharing it with those we serve. That is the end result: to give something of value to those who come into our theaters, classrooms, and museums.

So, forty years after GLPA came into existence, we gathered to remember, to share with each other friendship and learning that might enrich the lives of those who continue to come into our star theaters.

Throughout my years of being a planetarian, there has been debate concerning how long the planetarium profession might last. In less than 20 more years our profession will be one century old. Who could have predicted it would last that long? Who can predict how long it will continue?

There is great power in the words we put into our programs. There is great power in the images we use. The planetarium is a medium with great learning power and no medium has ever been created with greater power to inspire the intellect. We should use this power with care and we should enjoy every moment we spend creating and presenting our programs. It is my sincere hope that you will do so.

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The Mentoring of Red:  
2005 Armand N. Spitz Lecture

Presented at the 2005 Great Lakes Planetarium Association Conference

David L. DeBruyn  
Curator Emeritus  
Roger B. Chaffee Planetarium  
Public Museum of Grand Rapids  
272 Pearl NW  
Grand Rapids, Michigan 49504 USA  
ddebruyn@ci.grand-rapids.mi.us

I wish to thank the Great Lakes Planetarium Association's Executive Committee for giving me the honor of presenting tonight's Spitz lecture, and for the opportunity to do so at this milestone 40th anniversary conference, and from within the walls of the institution that has been so much a part of my life for over four decades.

When Gary Tomlinson sent his touching letter of invitation, it was accompanied by two things. One was the long list of preceding Spitz lecturers, numbering 37 in all. When I saw names such as Von Del Chamberlain, J. Allen Hynek, John Rosemary, Don Tuttle, Jon Marshall, Bob Elliot, Jim Kaler, Dale Smith, and many other respected colleagues, things got a little scary. When I started reading transcripts of some of their presentations, with their combination of wit, wisdom, experience, and insight, things got more scary. Then I thought about standing in front of you here tonight, a mixture of colleagues and friends of many years standing, and others who are today's bright stars in this indoor universe. That's when things got really scary.

The second enclosure included guidelines as to appropriate content and length, some of them specified by Armand Spitz himself. I'm sure Gary particularly wanted me to see that piece of paper. I could almost hear him thinking as he sealed the envelope: "I worked with this guy for more than a quarter century and he couldn't even keep a show script under 45 minutes, let alone a speech! He followed that up during one of our many phone conversations leading up to this conference by casually asking: "How's the speech coming? Have you gotten it to under an hour yet?"

Abstract
Most of us can recall individuals and circumstances that contributed significantly to our personal and/or professional growth. Those special individuals influence the life paths of those they touch, often without realizing it. The case is made that planetarium specialists, by the unique nature of what they do – bringing the universe indoors and interpreting it – are mentors: to the public they stimulate, to students they teach, and particularly to younger associates they work with over the years.

Keeping what Gary sent and said in mind, I wrote this out, read it aloud for timing, and then started editing like mad. So, with the clock running, let's have at it.

Mentoring is Important and Appropriate
Allow me to discuss with you something I feel strongly about, and also something I have been a direct beneficiary of throughout my life. Please consider with me the premise that by very nature of what we do – bringing the universe indoors for all to know and appreciate – we have the potential to become mentors. The American Heritage Dictionary defines a mentor as “a wise or trusted counselor or teacher.” Webster says such a person is “insightful, a caring and loyal advisor.” Often, without even realizing it, we as planetarium professionals can have a significant impact upon those we come in contact with, be they visitors to our domes, students we teach, the public we provide services to, or younger colleagues we develop relationships with. We work in a unique medium, and the impressive technical resources at our disposal can make this work fascinating. I contend that touching lives is the aspect of our work that contributes most to making it fulfilling.

This seems to me an appropriate subject for a lectureship named after a man who was, in ways both direct and indirect, a superb mentor to many of us here tonight. Those who can recall a personal relationship with Armand Spitz are, unfortunately, dwindling as the years pile up. However, his vision of bringing the uniqueness of the planetarium environment to places other than big cities, and institutions with big budgets, lives on. He made star projectors affordable enough to find their way into universities, high schools and smaller museums, and thereby provided opportunities for many of us here tonight to become engaged in this enjoyable and consuming occupation.

I am told by those who knew Armand that his outgoing personality, his enthusiasm, his technical creativity, and above all his passion for what he was doing — yes his passion — were attributes which contributed to his success. I feel very fortunate to have been associated over these many years with many of us here tonight. Those who and indirect, a superb mentor to others in this profession who exude those same admirable characteristics.

You veterans in this work can recall your own mentors, and also those you touched yourselves. You know the satisfactions. Allow me to therefore speak most directly to those of you here tonight who are in the midst of your most creative years — at or near your zenith — and especially to our youngest colleagues, those who have just joined the ranks of those we call planetari-
Often, without even realizing it, we as planetarium professionals can have a significant impact upon those we come in contact with, be they visitors to our domes, students we teach, the public we provide services to, or younger colleagues we develop relationships with. We work in a unique medium, and the impressive technical resources at our disposal can make this work fascinating. I contend that touching lives is the aspect of our work that contributes most to making it fulfilling.

A while ago, a friend whom I have known for quite some time related several experiences from his early years that I think appropriately illustrate our subject. My friend thought back to when he was growing up in West Michigan in the 1950s as a gangly, sometimes precocious junior high student with red hair and dark rimmed glasses – someone who hadn’t quite discovered himself yet. You teachers must get the picture: the awkward kid with insatiable curiosity who can be simultaneously delightful and annoying. My friend said that for as long as he could remember, he had been nick-named Red.

One summer night, looking skyward from his back yard, Red felt himself drawn to the shimmering points of light emerging from the fading twilight. He got a copy of Star Maps for Beginners from the library, and then stood outdoors, dew covered but fascinating, night after night, hooked on this opportunity to become acquainted with new friends up in the sky. The Big and Little Dippers intertwined with Draco the dragon. There were Orion, Pegasus, Hercules, and Scorpius, mythical figures portrayed in the starry patterns. He couldn’t get enough of it.

Red acquired a copy of Olcott and Mayhall’s Field Book of the Skies. I suspect many of you still have a well-worn copy somewhere. In it he found, for each constellation, sections devoted to selected sky objects to be observed with the Naked Eye, Opera Glass, and… Telescope. Red started thinking about a telescope. He had to get a telescope.

A man unobtrusively entered and stepped into cramped quarters. “This is where we are?” he asked as he ushered Red and his family out of the foyer, they were greeted by a known prismatic front doors, spectra dancing about the foyer, they were greeted by a dimly lit gallery featuring photographs of celestial objects and cases of antique astronomical instruments. There was an aura to the place – it was all about the subject Red loved. The audience was ushered into the “planetarium chamber,” as it was called in those days. There was a weird looking projection machine that looked like a giant insect on a wheeled platform at its center. The white domed ceiling seemed to stretch upward to infinity. Red looked around, wide-eyed with anticipation.

A man unobtrusively entered and stepped into a control booth. He explained that the room was not really the planetarium, but rather it was the unusual looking machine in the middle. He described the “Zeiss,” its multiple gears, projectors, and ability to show the night sky from anywhere at any time. The sun appeared high overhead in its noon-time position, and then slowly drifted westward. Just before it slipped behind a black silhouette of a simulated Chicago skyline, it reddened, just as in nature, and a twilight glow spread across the dome. As the realistic transition from day to night continued, the brighter stars appeared. It was pure magic.

The narrator explained how light pollution from a giant city like Chicago severely limits what can be seen in the night sky. “Close your eyes, and keep them closed as we imagine moving far out into the country, away from most sources of artificial illumination” he intoned. Red obediently closed his eyes in anticipation. “Now open your eyes and look upward.” Red tells me that he remembers to this day how it felt. That mesmerizing moment was forever cemented in his memory, reinforcing all over again his deep interest in astronomy.

The narrator pointed out planets, stars, and prominent constellations then visible with an arrow of light flittering around the sky, followed by a simulated trip to the North Pole, the show’s main theme. He then told the audience that they had spent all night in the planetarium and that the program was drawing to a close. Music came out of nowhere, building to a climax as dawn broke and the Sun rose. Then, as many of you have done more than once, the narrator ended the program by saying: “I want to be the first to wish you a pleasant good morning.” He invited anybody with questions to stop by the console on the way out.

Red leaped from his seat, but then had to wait patiently as others exchanged pleasures with the genial host. Just about everyone had left the room as Red nervously approached the console. After asking a couple of questions about astronomy that were patiently answered, he spouted. “I’m going to be an astronomer when I grow up!” The kindly gentlemen told Red that one of the reasons he himself got involved in astronomy was that he was inspired by his father, a professional astronomer. “What was your father’s name?” Red inquired. Frank Schlesinger was the answer. Red suddenly realized whom he was talking to. In Sky and Telescope, he had seen a section called “Planetarium Notes,” a listing of the country’s twenty-five or so public planetariums and their directors. (That’s right, only 25 in that 1954 listing.)

“Aren’t you the director, sir?” Red inquired, somewhat in awe. Mr. Wagner Schlesinger appeared flattered that the young visitor realized that indeed he was. “Would you like to see the back room, where the controls are?” he asked as he ushered Red and his family into cramped quarters. “This is where we store the lantern slides and this is the reel-to-reel tape deck for our background music. I just push a button on the console and turn a knob to fade it up.”

“Here, step up into the control booth. These are the controls for the Zeiss, and this is the device I use to create the arrow of light against the sky.” He invited Red to try the pointer for himself which he thought was just “way cool.” They departed with Mr. Schlesinger encouraging Red to pursue his interest in astronomy. “It might lead to an...
interesting career with everything that’s coming along,” he said. “There are plans to launch an artificial satellite in the next few years, and you must have heard about the possibility of one day sending men to the moon.”

Red told me he remembers that experience in the Adler Planetarium from a half century ago as if it had happened yesterday, so great was its impact.

It must have taken an extra ten minutes or so out of Mr. Schlesinger’s busy workday to give an inquisitive kid that special attention. But he did take the time, and in so doing may have helped Red eventually decide on a career that would prove to be one of extraordinarily good fortune. Red might still have chosen the same course had that encounter not taken place, but then again, maybe not.

Surely, Mr. Schlesinger could not have known it at the time, but he just may have had a profound influence on Red’s future path.

Back home, Red was in the midst of one of those self-esteem crises that most youngsters encounter at one time or another. Somehow, in those pre-Sputnik days, his 8th grade contemporaries weren’t into this “astronomy thing” as much as Red was. He was getting some new nicknames, like “professor” and of course “star gazier.” A kindly science teacher by the name of Glen Core, sensing Red’s feeling of being an outsider, befriended the young astronomer. He invited him to bring his telescope out to his home in the country, saying “Here, step up into the control booth. These are the controls for the Zeiss, and this is the device I use to create the arrow of light against the sky.” He invited Red to try the pointer for himself which he thought was just “way cool.” They departed with Mr. Schlesinger encouraging Red to pursue his interest in astronomy.

“Here, step up into the control booth. These are the controls for the Zeiss, and this is the device I use to create the arrow of light against the sky.” He invited Red to try the pointer for himself which he thought was just “way cool.” They departed with Mr. Schlesinger encouraging Red to pursue his interest in astronomy.

In doing so, he soothed a frayed adolescent ego. “You are really onto something here,” he said, “and obviously you are deeply committed to it. In time, your fellow students will come to realize the importance of what you are doing.” He gently added, “But do find some time to mix with them too, so you can all get to know each other better.” That last remark, sound advice, perhaps casually made, would help Red immeasurably. It would give him impetus to work on the social growth that would have to come if he were to successfully navigate the waters of life.

Surely, Mr. Core could not have known it at the time, but the interest he showed in Red, and the encouragement he provided, had a profound influence on his future path.

Mentoring through Indirect Influence

We spring ahead now to 1956. Red had entered high school and an article in Sky and Telescope caught his eye. It was about an engineer/amateur astronomer in North Canton, Ohio by the name of Richard Emmons and the planetarium he had built in a garage-like building in his back yard. This creative fellow was giving sky programs for the public, as well as school and civic groups.

“Well now, if this guy can do that, why can’t I?” thought Red, a cocky look spreading across his face. Red came across an ad in Sky and Tel. from Edmund Scientific. It read: “The Spitz Junior Planetarium, designed by Armand Spitz. Projects 70 constellations on walls and ceiling of any darkened room. Free illuminated pointer.” Red quickly sent off a check for the required $14.95. This all-consuming hobby was getting expensive.

While anxiously waiting for the much-anticipated package to arrive, he enlisted some help from his resourceful father. Together, they fashioned a makeshift dome out of an old beach umbrella with its handle sawed off and inside painted white. They pinned white sheeting around the perimeter to complete a hemisphere and hung the dome from the ceiling of a windowless basement room.

The arrangement was completed with boards placed across wooden boxes to provide the “luxury” seating, and an old Voice of Music record player for background music. While he waited anxiously for the arrival of the “main instrument,” Red built an auxiliary projector to simulate seasonal motions of the Sun, and another for the northern lights. He even included a black cardboard silhouette skyline of his hometown, inspired by the one in the Adler Planetarium.

When the Northside Planetarium opened amid much fanfare, it could seat six people uncomfortably, eight in a pinch. The school cooperated by allowing Red to print flyers on their ditto machine, so that show times could be posted on telephone poles and bulletin boards. For some reason, people did not come running. Audiences had to be solicited, coerced, or both, from among neighbors, schoolmates, and family members.

Years later, Red’s siblings and friends from his youth still relate amusing stories of falling asleep during the rambling lectures. Or worse yet, they would silently slip out of the darkened space as Red waxed on about the marvels of the universe.

Why do I tell you all this? Partly to amuse you I guess, but there’s more to it than that. Some years later, when Red was awarded his first and only full time professional planetarium position, the person who made the decision to hire him commented that one of the items from Red’s resume that caught his eye was that he had built – and operated – his own planetarium as a teenager. Would that hiring have happened? … would Red be where he is today? … had not Richard Emmons inspired him to build that basement planetarium. Would he have thought it up on his own? Maybe, but then again, maybe not.

Surely, Mr. Emmons could not have known at the time he submitted the article to Sky and Telescope, but he just may have had a profound influence on Red’s future path.

Yes, that is the same Richard Emmons who was a Spitz lecturer in 1997, and father of GLPA charter member Jeanne Bishop. Can there be any doubt that one of the most dedicated planetarium professionals around was inspired by her father, who unfortunately passed away this past year. I remember meeting Jeanne’s special mentor once myself. It was in Lansing in 1964, at a meeting of some of us planetarium types called together by Von Del Chamberlain. It would lead to the decision to form GLPA. Despite a blinding early season snowstorm, Mr. Emmons drove all the way up from Canton with a young Jeanne and her teenage brother in tow.

Mentoring Those in Transition

Following high school graduation in 1959, Red spent his freshman year at the local community college and lived at home. A science-math instructor there by the name of Stan Carr heard about the Northside Planetarium and asked if he could bring his earth science students over for shows. Well of course! That turned out to be quite an experience, both for the twenty five or so students traipsing up and down the basement stairs of a private home, (remember, the planetarium could seat at most six to eight persons at a time) and for Red’s ever patient parents, who had to put up with it.

A common interest bond developed between Red and the Community College instructor. The Space Age was now well underway and interest in astronomy was growing with talk of sending men to the moon and probes to the planets. With other interested students, Stan Carr and Red established a local astronomy club, which started conducting star parties and special events
In his last semester before graduation, and was thinking about waiting awhile before going on for further schooling. He heard from a staff member at the Exhibit Museum that the Grand Rapids Public Museum was looking for a "lecturer" for their new planetarium. He knew the Museum would soon from his home in North Muskegon long before the planetarium was built. He also remembered that great big whale skeleton suspended over the entrance hall of the Museum.

On his way home for a weekend visit, he stopped off at the Museum to check things out. The receptionist told him he would have to speak to the Museum’s assistant director, who was also in charge of the planetarium. She pointed toward a stairway to the second floor. “I think he’s up there.” Red bounded up the stairway and, hearing voices, poked his head into the doorway of a storeroom.

He said he was looking for a Mr. Frankforter. A slightly graying fellow with a crewcut and friendly smile extended a firm handshake. “I’m inquiring about a possible position — someone to essentially run the operation.” Mr. Frankforter further described the position, Red wondered: “Would I be qualified at my age? Would I have a chance?” But he also thought he couldn’t lose anything by giving it a shot.

Two letters of recommendation were required, and there was no question whom he would ask: the two people who knew his capabilities best, and who had offered so much encouragement over the past four years: Stan Carr and Heather Thorpe.

Once seated, he told Red that they were really looking for more than a “lecturer.” What they really wanted was a lead curator — someone to essentially run the operation. “Oh!” Red doesn’t quite remember whether he felt elated or disappointed. As Mr. Frankforter stood up from the table and left, Red asked: “Would I have a chance?”

Two letters of recommendation were required, and there was no question whom he would ask: the two people who knew his capabilities best, and who had offered so much encouragement over the past four years: Stan Carr and Heather Thorpe.

Back in Ann Arbor after an interview, Red waited anxiously. One bright September afternoon in 1963, the letter from the Museum he both welcomed and dreaded arrived. His hands trembled as he opened it. He wanted this job so badly! "It is my pleasant duty to write offering you …" Red didn’t even read the rest of the letter from Mr. Frankforter right away. He threw up his hands and whooped around the boarding house where he was staying, hugging every-
one in sight. He had his dream job.

A number of factors came together to make that happen. Foremost among them, Red sincerely believes, is that two wonderful people who believed in his potential took the time to write what he later discovered were carefully crafted letters that may have turned the tide in his favor when the decision was made. Another is that the people making that decision, as they later informed him, were impressed that Red had the ambition to build his own basement planetarium. Inspiration for that project, you will recall, came from Richard Emmons.

Red went on to a career spanning more than four decades at what would later be renamed the Public Museum in Grand Rapids. He would be touched by many more wise and caring colleagues and friends during that long tenure.

Mentoring Colleagues and Students

I suppose it’s time to let you in on something. This account is autobiographical. I can see that you’re shocked! May I add that most of what I have told you really happened.

So permit me now to continue in the first person. There are many others to whom this former redhead is grateful to for guiding him along a sometimes curving path through a career that has proven to be not only a perfect fit, but immensely satisfying. In the interest of that imposed time restraint, which is rapidly running out, I cannot possibly name them all, but several must be singled out.

W. D. Frankforter, Frank to his many friends and colleagues, moved up from assistant director to director of the Museum shortly after my arrival, and in that capacity would become my number one professional confidant and mentor for a quarter century. Frank was an unflinching source of encouragement and support. He was also one of the visionaries who would never give up on the idea that someday there would be a new building in which to display the impressive collections and conduct the long educational traditions of Michigan’s oldest museum. He also invited a fledgling group of planetarium specialists to hold its inaugural conference in 1965.

Following Frank’s retirement in the late 80s, our new director, Tim Chester, would guide that immense undertaking to reality. As the building you are sitting in, with its state of the art planetarium, rose on the horizon there in 1965.

Mary Esther Lee, planning coordinator for this marvelous building, a true visionary and master of making things happen, is now assistant director of the Museum. She has been for me an unwavering source of inspiration and encouragement over many years.

Her predecessor as assistant director, Ray Zuri, now retired, is someone I always felt at ease with. I knew that when I walked into her office with some issue or problem, and there were a few along the way, she would look me directly in the eye as I spoke and would deliver sound counsel.

I was lucky to have, for more than a quarter century, two loyal, capable, and committed colleagues at my side. I never checked it out for sure, but I think the time Gary Tomlinson, Mark Perkins, and I spent together in this business would be pretty close to an unprecedented run for a trio of people at one planetarium. Since early in 1977, we have together experienced, or interpreted for the public, such astronomical highlights as landing of the first instrument probes on Mars, the visit of Halley’s Comet, including Gary’s infamous Comet Pills, solar eclipses, more school shows than we could count, and more amusing inquiries from the public about “lights in the sky” than we want to remember.

The design of our present planetarium “works” so well largely because of their technical expertise during its planning stages, and attention to potentially overlooked details during construction. I think Gary and Mark will agree with me that our proudest collaboration was our last together before their retirement — the 2003 planetarium show “The Dead Sea Comes Alive” to accompany the Museum’s blockbuster exhibition of the Dead Sea Scrolls. That show alone was seen by close to 50,000 people during a three-and-one-half-month run. That’s a lot of shows! Thanks guys for all you have contributed, both to the Chaffee Planetarium, and to me personally.

During the early years of GLPA, some very committed and creative people would come into my life and leave their mark. Foremost among them would be Von Del Chamberlain, the number one moving force behind both formation of GLPA, and a few years later, the International Society of Planetarium Educators, forerunner of IPS. Von Del was not only a pioneer in colleague-ship and innovation, he was a quietly effective mentor to Dennis Sunal, Bob Victor, Dave Batch, Jim Pike, me, and a whole slew of other young bucks.

Among GLPA’s charter members who helped set the bar of innovation and professionalism high were Ralph Ewers, Don Tuttle, Jon Marshall, Bob Elliot, and Jeanne Bishop, to name only a few of the many who come to mind. And Maxine Haarstick. Who in the world could ever forget Maxine Haarstick from Minneapolis? What a character! Those of you who knew her are smiling right now, aren’t you? Unfortunately, she is among those who have left us. But, fortunately, other veterans are still robust and delighting in planetarium work, and are here this week to share in the exhilaration of this 40th anniversary conference.

Many of you can, like me, look back fondly on individuals who influenced your life’s course. Gary Tomlinson has more than once mentioned how much Newton Sprague, the late planetarium director at Ball State University in Indiana, influenced him while he was there. Another of Sprague’s students, Ron Kaitchuck, became his successor at Ball State, and has himself influenced up and coming planetarians, with his mentoring and through yearly summer seminars. Rickey Ainsworth, the capable coordinator for this meeting, attended one of Ron’s summer sessions back when he was a teenage intern here at Chaffee.

Mark Perkins for years has kept in touch with his mentor, Bob Elliot at the University of Wisconsin-Eau Claire. In 1976, while I was serving as President of GLPA during the hectic conference in Chicago, Bob sought me out. He had heard that we were casting about for a technical specialist for the Chaffee Planetarium, and he thought I should take a look at his self confident and committed student protégé. Look what that recommendation led to.

And how about Gregg Williams? Every year, he comes with his wife Barb and an entourage of student assistants in tow. Next year, we will surely find them running around making sure the Merrillville conference runs smoothly. I don’t envy them!

Many of you can also recall with pride students and other young people you positively influenced, perhaps through encouragement, perhaps through providing opportunities, or perhaps through just a kind word at the right time to help them along the rocky road of life. You remember who they are, and, I suspect, they remember who you are.

A majority of these young people go on to significant careers in a great variety of professions, enriched by their exposure to the unique medium the planetarium provides. Some even become astronomers and planetarians.

Think of all the planetarium specialists who have emerged from under that little 5.5-meter dome at the University Exhibit Museum now presided over by Matt Linke, and before him Gary Beckstrom, and way before him, Heather Thorpe. The list begins back in the mid-1950s with Eileen Starr. (Remember
... don’t ignore the little things that can make a big difference. O.K., most of you have more than once encountered the inquisitive little kid who stays after the show with a barrage of questions when all you want to do is get on with your busy day. When this happens, please recall again the story of Red, a similarly inquisitive kid who had something of an epiphany when the director of the Adler Planetarium gave him special attention.

Second, don’t ignore the little things that can make a big difference. O.K., most of you have more than once encountered the inquisitive little kid who stays after the show with a barrage of questions when all you want to do is get on with your busy day. When this happens, please recall again the story of Red, a similarly inquisitive kid who had something of an epiphany when the director of the Adler Planetarium gave him special attention.

Then there are those letters from youngsters that come in. The giveaway is the nearly illegible penmanship in the address. “I am in the 4th grade. I have to make a report about the planets. Send me all you know about the planets.” You know what you’re tempted to do with that letter, don’t you? But stop, wait a minute before you discard it. Maybe you could find the time to send a brief response suggesting that the inquiring student visit the library, or in this day and age, consult a recommended astronomy web site. Today, with our electronic marvels, you can keep a form letter in your computer to be tweaked, personalized, and dropped in the mail, all in just fifteen minutes or so. The recipient will surely appreciate your effort, and it could make a difference. Invite the youngster to come to your planetarium to learn more. At least respond in some way.

Permit me one more quick story. When cleaning out correspondence files in 1994 prior to our move to the new building, a letter I received back in 1974 caught my eye. It read: “I am in the 9th grade and very interested in the planetarium field, possibly as a future career. I am attempting to obtain as much information as possible concerning the field. Please send me information about your planetarium.” (Sounds a little like one of those fourth graders doesn’t it.) There were additional specifics, and the letter ended with “Thank you very much for your cooperation,” and it was signed John Stoke.

I sure am glad I responded to that one. John went on to a career that has been of benefit to planetarians everywhere, during his years with Sky-Skan, through his imaginative planetarium scripts, and most recently as the Manager of Informal Science Education at the Space Telescope Science Institute in Baltimore.

When one of your promising young students or interns, or a former employee, asks for a letter of reference or an evaluation form filled out, do your best to oblige. It can seem like an imposition, but you never can
be sure where it may lead. Again, think back to the story of Red. If Heather Thorpe and Stan Carr had not taken time to write well-considered letters on his behalf, that kid may never have attained his “dream job.”

When a youngster asks to job shadow or for an interview about your work, try to take the time. And what about those career days that you are asked to participate in right in the midst of the annual “spring rush” of school visits, or when a new show has to be ready in a month and you have just started writing the script. It’s tempting to turn down such requests for still more of your time, and I will confess that I sometimes have to, but always with a tinge of guilt.

There might be a Red out there somewhere who gets turned on to consider a career doing what you do because of the enthusiasm you naturally exude because of what you do.

My last and most important point is to reiterate once again: Do not, I repeat do not, forget that you have the potential to be effective mentors. By getting capable and receptive individuals involved in what you do, and by setting a good example, you have, by the compelling nature of what you do, an opportunity to influence lives.

When a local high school or college requests that you take on interns, or tells you about some special needs student who could benefit from working in your facility, consider it. If I’ve learned nothing else in more than forty years of working at this Museum, it is that the many highly motivated young people who have passed through here are an incredible talent pool.

As an example, our current public show was created by two young professionals who started out working here as college students, and then went on to form their own production company called Highlight Design. “Europa, Life Finds a Way” is a wonderfully imaginative work of Katherine Herzog and Dan Tell, two standouts from among our current crop of student assistants.

Those of us who administer planetariums must be willing, for our part, to have enough faith in these people to give them the elbow room necessary to exercise optimum creativity, and to then sit back and watch the sparks fly. (Sometimes literally) Yes, they will mess up once in while, but they will also learn from their experiences. I subscribe to the premise that if you believe in young people, and let them know that you do, they will do their very best to live up to your expectations.

Surely, conveying to protégés, some of them future planetarium professionals, our personal enthusiasm is easy. After all, we have the wonders of the universe at our fingertips, and what we do is so varied and interesting that it cannot even be clearly defined. We are part astronomer, part educator, part artisan, part technician, part actor, part communicator, and may I add to that list, part mentor.

Epilog

I ran into Red not long ago. It had been a long time since I had seen him, and I noticed that with the passing years he was getting a little long in the tooth. Some say his memory isn’t what it used to be. While the carrot top was now mostly gray, I could tell he still had life in his step, stars in his eyes, and a passion for astronomy coursing through his veins. He said he still gets a feeling of wonder whenever he steps out under a star-filled sky, just like when he looked upward from his back yard so long ago. He also said that his enthusiasm is rekindled whenever he encounters the right kind of audience under a planetarium dome. “Do the others out there who work in planetariums still have it too?” he asked inquisitively. “You know, the sense of wonder, and the feeling that they have the best of all possible jobs.”

His voice trailed off. “Oh, I think most of them surely do,” I answered confidently. “The sky will always have its potential to inspire, and to feed the spirit with its majesty.”

“But what about all those new people— you know, those young whippersnappers who are taking over everything and sometimes changing the old ways of doing things. Will they have what it takes?” he asked. I assured him that to me they appeared to have every bit the same enthusiasm and passion as their predecessors, and some mighty effective new technology to make their own splash with as well. Red hesitated for a moment. “And do you think they will take the time to mentor others, and to help them along life’s pathways, the way all those people helped me?” I assured him that I would be passing that message to valued colleagues soon and felt confident they would take it to heart. Red smiled and said he felt mighty good about that.

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The Essence of the Planetarium in the Use of Pedagogy

Tuukka Perhoniemi
Ursa Astronomical Association,
Raatimiehenkatu 3 A 2
FIN-00140 Helsinki, Finland
358-(0)9-6840 400
tuukka.perhoniemi@ursa.fi

Abstract
In the age of hi-tech planetariums we are more compelled than ever to ask the basic questions: What are the essential characteristics of a planetarium and how can we use those characteristics to support our pedagogical aims? Why should we use a planetarium to teach something and how should we do it? Exploring these questions we can find the idea of philosophical attitude as wondering and the planetarium as a place for evoking this special attitude.

A planetarium is something special. But what is this “something”? In what way is a planetarium special? How does teaching in a planetarium differ from teaching astronomy in a classroom? How does visiting a planetarium differ from going into the movies? How does a planetarium differ from the real sky or theoretical models of our solar system?

These questions are important for a planetarian who wants to achieve a reflective grip on his or her way of working with a planetarium. They are especially important when the pedagogical or educative aspects of a planetarium are considered. And they all come together in one question: What are the essential characteristics of a planetarium?

The essential characteristics are the strength and the most authentic core of a planetarium. As such they are also the key to the idea of planetarium-pedagogy, which is not to teach something but to evoke a philosophical attitude. In order to understand all this, let us reflect on the following questions:

1) What actually are the essential characteristics of a planetarium?
2) What are our pedagogical goals?
3) What happens when we put these together?

What are the essential characteristics of a planetarium?
In the context of pedagogy it is easy to understand why people use a planetarium just by comparing it to the “normal” teaching at school. A planetarium is different and exciting. But, there is more than this. A planetarium also has other significant aspects that are essential just for the planetarium and different from movies or books or other scientific models.

In its most essential being a planetarium is basically all about making otherwise distant and theoretical things somehow alive. A planetarium does this by positioning us in a reality-like situation and directing our attention to one aspect of this reality: our being under the sky. Of course one can nowadays do all kinds of things in planetariums, but still, this is the most profound idea of the planetarium. And it is present more clearly in itinerant planetaria than in the big ones.

This profound idea of the planetarium is related to the essential characteristics or properties of a planetarium that are both technical and traditional in their nature. While using a planetarium, we can either choose to use those characteristics or not to use them; we can do things in line with those characteristics or fight against them. Everything we do in or with a planetarium is somehow related to those characteristics.

Now, what are those essential characteristics of all planetaria?
Planetarium – the name gives us the first ideas. The Greek word planetes means “the wanderers.” To be more precise, in the original astronomical sense, it means “to wander between the fixed stars.” This refers, of course, to the possibility of demonstrating the movement of heavenly bodies in a planetarium. This is easier to demonstrate in a planetarium than by going out in the evening and staying outside for the whole night. This is simple and clear – in a planetarium we can show the daily motion of the stars in five minutes, go to different latitudes and see how the night sky is different on different months of the year as well as show the movements of the sun and the moon. In this way a planetarium is at the same time almost “like the real sky” and also something more.

The second hint comes from the suffix (-arium) in the word planetarium. It tells us that a planetarium is a place (“a place for” the planets). It is not just an orrery, a model for representing the movement of the planets. It is a place.

What does it mean that it is a place and what kind of place is it? What else is there, than that it is a restricted area with walls and a roof? A place, compared to space, is something more intimate and reachable. The astronomical space is anonymous, impersonal and easily very abstract – while place is more concrete, sort of “lived space.” This lived space is something present and ambient, we are related to it and it is related to us. It has personal significance to us and it is something that feels like “our own”. It is our spatial environment where we live with things. And perhaps most importantly, it is something we can really experience, not just theorize about.

Having an experience of being under this perceived dome of heaven is the way to get some kind of grip and personal relationship to astronomical space. There, for example, the visible stars have names and a certain place in the constellations and the sky forms “the roof” of our lives. A planetarium can serve as this place with its starry dome.

When we are in a planetarium we are in a certain kind of place. As place-philosopher Edward Casey expresses it:

“To get into the spirit of a place (genius loci) is to enter into what makes that place such a special spot, into what is concentrated there like a fully saturat-
A planetarium is exciting as a place. It is exciting because it is different, but also because it gathers interesting aspects together. It gathers space and imagination, sets heaven and earth into an easily understandable relationship. It gives us a reachable whole, a cosmos with things in the “right” places. And here, with the word “cosmos”, I point to its old meaning as an ordered whole - the cosmic and aesthetic come close to this cosmos.

The purpose of these descriptions is to point out that a planetarium has its own kind of general character of bringing distant things nearer and also bringing us, the people in the planetarium, into this nearness, to meet these things.

Now, these aspects, wandering of the stars and the place-character, take us further into more specific characteristics of a planetarium such as 1. an image, 2. as the view from the inside, 3. as round in shape and 4. as a dark place.

1. An image

Sometimes some of the smallest planetarium guests ask: “Are those stars real?” In many cases you are tempted to answer something else than just plain “No they’re not.” Well, what else can you say? Let us think. In that moment, what is the actual significance that the stars aren’t real? Is it that because they’re not real, then everything else in that moment or in that place must be false too? Or, is the point that the stars actually look a bit different in the real sky? As a question of knowledge this is perhaps not an easy one, but if our goals are not about knowing something, then the significance of the planetarium’s representative nature is somewhere else. A planetarium is a picture, an image of reality. It can be used as a movie theatre (for example) but as a planetarium it is an image of the sky above us. Not just the sky, but “the sky above us”.

Thinking in the concrete, this hints that to actually see the horizon could be important in a planetarium.

As an image, does it matter what the stars look like? Does it matter whether they look real or not? Yes and no. In either case they should support the awakening of the wondering, the amazement of people. There should be some kind of an illusion of the greatness and per-

What does one wonder during a planetarium show? The planetarium in the middle: Look around - what do you see? Person on the left: Why is there anything and not just nothing? And on the right: Are those stars real? Credit: Satu Paakkala and Ursa.

haps strangeness of the universe that sets people off their normal course, that people have the feeling that something different is about to happen and that they can be tuned into another, perhaps more philosophical, frequency.

Therefore, practically speaking, that they look representative of stars is enough. It does not require the most sophisticated and most realistic-looking stars to make the sense of wonder happen. If the attitude and atmosphere are right, then a bit poorer image will do the job. Some kind of an illusion is needed, but there is a limit where the technical aspects of this illusion, how little or sharp or right-coloured the stars are, are not important anymore. Perhaps the important thing here is that they should not look like or at least not move like in the “Hollywood reality”.

When “Hollywood reality” is mentioned, two important remarks must be made: It doesn’t do any harm for pedagogical aims if the stars look better and better. But, if we move in the direction of entertainment, that is, competing with Hollywood, then we are perhaps losing something from the pedagogical orientation, and for certain losing the competition of customers.

The most important aspect of a planetarium’s imaging capabilities is that as a dome-like place it is not just a map, not a planisphere, it has certain amount of depth. But it is still like an image and its view is from the inside.

2. View from the inside

As a miniature cosmos a planetarium is always a view from the inside. It is not an outside view of our solar system, galaxy, or universe. It is not a theoretical and scientific model that presents the earth from the third person’s view. Basically it is an Aristotelian universe where the sun rises from one direction and sets to the other. When we are in a planetarium, just as when we are on the surface of the earth, we don’t have any perceptual way to prove that, for example, the earth orbits the sun. Instead, it is clearly perceived that it is the other way around.

This view means that we can concentrate on the perception. We can just show things: “Look around, what do you see?” and observe how everything happens. We don’t need to prove or claim anything in the planetarium other than just for provocation or to direct the attention of the observers. We could perhaps start by saying to the people: “You don’t have to know anything or believe anything I say. You can just look.” And the aim of this is to get people to hesitate, to make them try to understand. We should somehow shake their “entertainment-oriented” or “knowledge-oriented-mode” and rather just let them perceive things and then invent the questions themselves.

And the answers? They’re out there, in the surrounding world. The ideal case would be that the planetarian would not act as a keeper of secret wisdom, but more like Socrates who makes people ask the questions and also gets them to answer.

If the idea of a planetarium is to make the starry sky living and meaningful from our real first person’s perspective, what then is the role of models with the outside view? An outside view, of our solar system for instance, can perhaps be combined with the planetarium sky. But the planetarium itself is at its best when keeping it like it is, an inside view. That is what the planetarium as a planetarium supports. The point being made relates to all the auxiliary projections that can be used in a planetarium. For instance, showing telescopic images inside the planetarium is one way to use the time we have there with people, but the planetarium with its round shape doesn’t bring anything more to
it. We can show pictures in the classroom also, or study models anywhere. Orreries and many kinds of hands-on demos are good but they are not the same thing as the planetarium. The way they are combined with the planetarium must be thought about carefully, because combining whole different levels and perspectives of representation into one understandable whole is a difficult task.

3. Roundness

The question of slide shows leads to consideration of the typical shape of the planetarium. It is round. This is not just a contingent, technical or architectural coincidence. It is also essential to the planetarium. The roundness includes two aspects: a) the planetarium has the shape of a dome, it is spherical, and b) it is also circular, it does not have walls with angles.

The shape of a dome makes it possible to create an illusion of the real sky bending over us as an arch. The sky is over us in every direction. It is also purposeful to use it that way, for the illusion is best created if the whole dome is used for it - when the dome is used as a dome.

What about slides or films that don’t cover the whole dome? They don’t break the illusion, but they don’t create it either. The nature of slides and other ordinary pictures is different than the nature of all-sky images. In the limited pictures the illusion is not present. They are just ordinary pictures and they don’t create the illusion. Now the question is: What happens when we use limited slides together with all-sky images that fill the whole dome? They are seen in relation to each other. The artificial nature of slides is emphasized and the starry dome is seen as the background space. And this is something we can use for our purposes.

The second aspect of the roundness of a planetarium is that it is circular. This makes it possible to arrange the people, usually sitting, in different ways. One way is just to put people into lines, to watch in one direction that is usually south. Another way would be to seat them in an amphitheatre-like order. A third way would be to have the people sitting concentrically, near the walls in a circle.

In the course of the show people probably turn their heads around to look in different directions to see what they want to see. That way the seating arrangements are just a matter of convenience. But there is, again, more to it. The seating arrangement creates expectations, directs the atmosphere and can either support or be against the main purposes of why people are in the planetarium.

Straight lines of seats remind people of school classes, lectures and papers, where one person, an expert, gives the facts to the listeners. Amphitheatre style seating makes the planetarium feel a bit more theatre-like, a “cultural” feeling, and people have different perspectives of the dome. The ring formation gives the audience perspectives equally in every direction and creates a kind of “sitting around a bonfire” feeling.

If the person who operates the star projector and the other possible gadgets, is in the middle this leads to the following: The ring-like positioning of seats makes her a guru listened to eagerly (?) by everyone. The amphitheatre seating places her still in the middle, but not on an actual stage as in a theatre. The classroom positioning leaves her in the middle of everybody, kind of like one of them.

Which of these is the best alternative? They all serve different purposes and have their pros and cons.

4. Darkness

The fourth essential characteristic of a planetarium is that there is dark. Whatever is done in the planetarium, usually at some point the lights are turned off. How can we think about this? It seems obvious that it is not just the moment when the lights are dimmed that matters. Darkness in a planetarium is related to many things; we can adjust the level of darkness, people behave in different ways when it’s dark, the senses function differently in the dark and so on.

Darkness is an unusual state and that is why it can be thought of as opening unusual possibilities. Speaking concretely this means, for example, that there is the possibility of demonstrating the effects of light pollution. But the actual showing of the effects of light pollution is not the most important advantage of darkness. Where does the darkness guide us, the working planetarians, to pay attention?

Especially with children, darkness can lead to an uncontrollable chaos. What do we do then? We are at the verge of the most important aspect of a planetarium-presentation. That is the social situation in the planetarium. If the chaos stays, nothing else matters that much. If the social situation is suitable then it is also possible that something interesting happens. Nothing is more important than the right kind of mental atmosphere. After the atmosphere is right nothing else matters that much - this time in a positive way.

Darkness can open the space for wondering and paying attention to those aspects of our reality that are usually left unnoticed. In the darkness we notice different things than in the light. When we don’t see where we are (on the ground), we lift our eyes to where it is light (the stars).

What are our pedagogical goals?

While thinking of the pedagogical situation in a planetarium, all the previously mentioned aspects are influential. They are important when thinking about what kind of atmosphere one wants to create. And this directly affects the attitudes of people. So we must reconsider some basic questions: What do we actually want to do with a planetarium? And how do we use the planetarium?

The essential characteristics of a planetarium and the idea “pedagogy” go hand in hand, in a way. This pedagogy or teaching in a planetarium is not about teaching facts, not about numbers and knowledge. It is about creating an atmosphere for wondering about the environment, it’s about promoting an attitude that makes us open and directs our attention to the surroundings, and then, makes us think about what everything is all about: “Why is there anything when there could just be nothing?” How often do you hear this most profound question in the planetarium? This philosophical attitude can lead to facts and knowledge, but the primary and most basic aim in planetarium-pedagogy should be to call forth this attitude.
tion between perception (something everyone can make and have on their own) and factual knowledge (something that is in many cases given from above without one’s own experience), and pay attention to this distinction and its different dimensions.

It is easy to justify the use of a planetarium because it is exciting and something different than “normal” teaching methods. However, besides this there are also other dimensions within the planetarium. These other dimensions are important because they are part of the force that a planetarium inherently has, something we can either use or fail to use. This is important especially in mobile planetaria because they still have a chance to do this, while the focus of big planetariums is in many cases somewhere else.

What happens when we put the essential characteristics of a planetarium and our pedagogical goals together?

While thinking about the characteristics of planetariums and pedagogy, it can be noticed that the characteristics can naturally support the above-mentioned idea and pedagogical aim of evoking a certain kind of attitude. That means, to make people philosophers who are able to wonder and think for themselves, to get inspired under the stars, under the dome. The knowledge isn’t important at first. Just to perceive, to ask and not take all the answers as truths, but to understand oneself - this is also where all the sciences have their origin, as Aristotle puts it:

"It is through wonder that men now begin and originally began to philosophize; wondering in the first place at obvious issues, and then by gradual progression raising questions about the greater matters too, e.g. about the changes of the moon and of the sun, about the stars and about the origin of the universe.” [Aristotle, Metaphysics 982b. Translation by Hugh Tredennick in Aristotle, Metaphysics, Loeb classical library 1933. Alterations based on the Greek text made by T.P.]

This is, of course, the old idea of philosophy, namely thaumazein, or "to wonder" in English. It is strongly related to education as the Greek paideia, or German Bildung, understood as readiness to meet the world. A planetarium can be seen as a certain kind of place that gathers attention and can be used to develop one’s own potential in the context of life.

Now, one issue still remains: What does this all mean in practice? How can we make all this happen? This is a question that has no ready-made and given answers. It is a challenge that each planetarian can approach more thoughtfully by considering what is the essence of planetarium.

[These ideas were originally introduced at the Third European Meeting of Mobile Planetaria in Nantes, France, 6th May 2005. I want to thank all the planetarians who discussed these ideas with me, especially Susan Reynolds Button.]
Richard H. Emmons:  
Small Planetarium Innovator  
May 29, 1919 - June 29, 2005

Jeanne E. Bishop  
Director, Westlake Schools Planetarium  
24525 Hilliard Road  
Westlake, Ohio 44145 USA  
bishop@wlake.org


The Planetarian is an appropriate place to describe Dick Emmons’ contributions to the development of the small planetarium, with brief comments about how he influenced me in my own planetarium career. But I also want to share the context of other aspects of his life, one which was devoted to astronomical education and research.

Emmons was born on the day that the Einstein’s General Theory of Relativity was confirmed, and it seemed to portend a lifetime of enthusiasm for astronomy. When he was just 14, he became a sidewalk astronomer in Canton, Ohio, using a five-centimeter refractor that his father had worked hard to buy him during the U.S. Great Depression. By age 16 he presented regular radio programs, wrote monthly newspaper articles for a paper with a daily circulation of 50,000, and gave talks to a variety of area groups. His early talks and articles seemed very much like openings to planetarium programs. Consider his words in 1937 (age 18):

… “Imagine ourselves away from city lights at a point where no obstruction mars the view of our universe of stars. There is hardly a person who would not turn his head skyward in wonderment. We find ourselves rooted to the surface of planet Earth. How insignificant we are in size and in physical importance! Yet we have, by our ability to reason, literally conquered the depths of space. With telescope, spectroscope, camera and other instruments, supplemented by extensive use of mathematics, we have learned the distances and diameters of worlds to which we have not traveled, the temperatures of the glowing balls that are the stars, and the laws of force that cause the heavenly bodies to move as they do…”

My father wrote this at a time when very little astronomy was included in the U.S. public school curriculum, and most people knew very little about the universe and objects in it. As I have concluded and described in other articles, the 1898 Committee of Ten made decisions that had a strong influence in all but eliminating astronomy from pre-college schools in the first half of the twentieth century. Always wanting to share and teach the nature of the universe, Emmons made decisions throughout his life that would bring astronomy to as many people as possible, as well as to help people learn more about the universe through research.

Dick became interested in astronomy at age 12 while reading an article in Popular Science Magazine about “a mountain on the loose,” an asteroid that had a chance of striking Earth. Voraciously he read every book in the Canton Public Library and found the library wanting. With an appetite to learn more (and no Internet or teachers who could help him), he began writing to astronomers. One letter, written in his teens, was to Albert Einstein. Dick asked about Einstein’s ideas concerning extraterrestrial life. Einstein replied from Princeton, in German:

Very Honored Sir!  
I have never given a public opinion on the question you ask, and I am convinced that to answer this, various pertinent foundations are missing. Beyond the assumptions shown by Nature’s Laws, that life exists in various forms and is of no peculiar exception on our planet, we are left with nothing but the acknowledgement of ignorance.  
With greatest consideration  
A. Einstein

Influenced by the need he saw at age 12 for the monitoring of Earth-crossing asteroids, later in his life Dick devoted much time to tracking small bodies. He became the first regional Team Leader of a Smithsonian Astro physical Observatory (SAO) “Moonwatch” Satellite Tracking Station (Akron-Canton, Ohio) and participated from 1956-1975, and he was part of the design team and a key observer with the NASA Mobile Satellite Photometric Observatory used at Mount Palomar, a Goodyear Aerospace project. Dick had the pleasure of meeting and sharing results of his space work with dignitaries visiting Akron and Canton, including Wernher von Braun and Willy Ley.

Dick maintained his interest in objects that could collide with Earth. In 1982 he calculated a trajectory for a spoof “Comet Hoax,” publishing “precise” parabolic elements in Jay Gunter’s, Tonight’s Asteroids. Brian Marsden at the Smithsonian Astrophysical Observatory checked the calculations, confirming the impact time and place. In 2000 Marsden, with Eleanor Helin, initiat-
ed the IAU naming of Asteroid Emmons 5391 for an asteroid that Helin had discovered at Mt. Palomar in 1985. The honor was not for the sham of “Comet Hoax,” but for accomplishments like the following.

On February 29, 1964, our family took two cars to go to dinner at a nearby restaurant. Dad excused himself early and said he was going home, perhaps to make himself famous with observations of a satellite. He “resurrected” the abandoned and inert ECHO I satellite as a sensitive probe of the near-Earth space environment. He had spent many hours preparing for the satellite pass, working out the exact trajectory and memorizing magnitudes of close stars. From our back yard he watched ECHO I emerge from the west and cross the sky near the zenith.

In the next few days he reduced his comparison-photometry data (with a calculator, not a computer) taking into account such factors of phase angle and extinguishing effect with altitude. His years of experience with photometry, optics, and perception, and satellite geometry, and his keen observation skills, all came together.

When Dick compared his labor-intensive data to graphs of diffuse and specular bodies, he concluded that after several years in space, ECHO I was (still) specular. This meant that there had been far less degradation by micrometeorites (with radiation and the hard vacuum of space) on the satellite’s surface than previously thought. Space was two or three orders of magnitude more serene than had been widely thought. Space was two hard vacuum of space) on the satellite’s surface than previously thought. Space was two or three orders of magnitude more serene than previously thought. Space was too dangerous for people.

With my father’s observation, cheered by J. Allen Hynek and Fred Whipple, Directors of the Satellite Tracking Program at the Smithsonian, the PAGEOS (Passive Geodetic) satellite was approved. My father observed PAGEOS from the NASA Mobile Satellite Photometric Observatory, a 7.3-meter f/20 Cassegrain telescope on a 4-axis mount. The result is known; the U.S. manned space program was rushed back into active operation.

Dad’s presentation at the June 1964 AAS meeting, citing Dick’s observations as “outstanding” and “a fine piece of work” was in part quoted by Whipple in the New York Times.

Another anecdote reveals Dick’s skills with orbital mechanics. He made an observation before dawn on February 18, 1959. From the radio he learned the minute that Vanguard II had been launched and its initial direction from Cape Canaveral. The satellite’s planned altitude and orbital inclination had been published earlier. Using this information, Dad sat at our kitchen table using a slide rule, calculating when he could first see it. Since Vanguard II was a small satellite, he knew it would require a telescope. At 5 am, with the temperature in North Canton hovering near zero, he saw Vanguard II pass through the center of the field of his 20-cm telescope. As was customary, he immediately sent a telegram to the Smithsonian reporting the time of his observation to a tenth of a second, with the satellite’s right ascension and declination. He shaved and rushed off to be at his job at Goodyear Aerospace on time.

That morning at work he got two calls from the Smithsonian. The people there congratulated him for being the first in the world to see Vanguard II. Then they called again, because their computer staff now wanted to know how he did it. Always before, the first observations of a new US satellite had depended on their own computer predictions.

Dick may have been the first person in the US to see Sputnik I. He certainly saw it, while his Moonwatch team was tracking with binoculars in another direction during a full alert on the morning of October 13, 1957. Dick saw it with unaided eye looking in a different direction, anticipating the satellite’s arrival across the fields of view for his team members. By the time Sputnik reached the Moonwatchers’ binocular fields, it had crossed their antemeridian fence in shadow. Dad was too astonished to be certain of the object’s identity at the time, since he thought that Sputnik would be so faint that it would require binoculars and other methods directed by the SAO. Therefore he missed acquiring the necessary details for data reduction.

Research was interesting and important, but Emmons’s passion was education, for the public and his own students.

In 1937, as a freshman at Ohio Wesleyan University...
University, representing the Perkins Observatory at the WLW station in Cincinnati, Dick gave a moment-by-moment description of a lunar eclipse visible across North America from a small windowless cubicule of a Canton radio station, microphones from different national stations surrounding him, and a heavy rainstorm outside. A few days later a stranger who was heading to New York hitched a ride in Dick's car. The traveler raved about how he saw a beautiful lunar eclipse from Texas and the “great” astronomer who gave such a clear and interesting talk about what to look for and what was happening. My father did not have the heart to let him know that he, a mere teenager, was that person.

Seeing Emmons' many contributions - building dozens of reflecting telescopes, contacting the U.S. Associated Press about astronomical discoveries that were then published around the country, predicting auroras from sunspot activity, and making an observation of the occultation of Venus lauded by the U.S. Naval Observatory, Dr. E. C. Cherrington of Ohio Wesleyan's Perkins Observatory recommended Emmons at age 18 for membership in the American Astronomical Society. Dick was the youngest nominee ever. However, it was two years before Dick became an AAS member, because the membership committee said that although he had certainly done enough to merit the appointment; they did not want to set a precedent of having such young members. At the time of his death at age 86, Dick had been a continuous AAS member for 66 years.

In 1938, enrolling as a sophomore at Kent State University, Dick took the 33-cm telescope he had made, then the third largest in Ohio, to the University. One of over 70 he made in his life, this one was a thin-mirror (32-cm plate glass stock) that he ground and figured to f/9 in the summer of 1938. He built a square trussed open tube telescope, a heavy pipe equatorial fork mount, and an observing platform. He called the telescope the “Evening Star Observatory,” and he invited classes and student groups for talks and observing sessions. He made an agreement with University President, Carl Leebrick to present volunteer lectures and offer observations to interested students and community members the first clear evening each week during the first semester. Many visitors mounted the five-step platform to reach the eyepiece, sometimes three meters above the ground. The Board of Trustees of KSU permitted the temporary installation of the telescope on the front campus.

In October, 1938, Dick was giving views of planets with the telescope when Orson Welles broadcast his War of the Worlds. Evidence that the panic had touched Kent, Ohio, was people from town rushing to him, screaming, “Do you see it? Do you see the flying saucer?” Dick wrote,

> My experience with the astronomical-ly-naive public of that era allowed me to immediately grasp the true situation. I calmly told them that what they were hearing was just a radio play, and there was nothing to be seen. One man insisted otherwise and asked me to go over to his car with him to listen, which I did. We tuned in just as the radio announce said they were switching to Washington for a special broadcast on the national emergency and introduced “the Secretary of the Interior!” I listened for just a few minutes and then repeated that this was a play. I left the man standing at his car, no doubt still unconvinced.

On the next day, Halloween, Dick learned that Orson Welles had upset the whole nation with his Mercury Radio Theater's presentation. On the day of Dick’s death, June 29, 2005, the front page of the paper carried an article about a new film, War of the Worlds.

After a year at Kent State, Emmons went to the University of Southern California. He hoped to be selected for a newly-created part-time position of astronomer-lecturer at the developing Mount Palomar, and he thought he could take classes and work simultaneously. He was a final candidate (of five), but he was not picked. So he pursued a full-time course load majoring in physics and math.

Stanislaw Ulam was Dick’s favorite math professor for a senior mathematics course in 1945. The two met for coffee at the student union cafeteria each Wednesday and Friday after class. At one coffee session, breaking from an intensive discussion of math and astronomy, Ulam invited Dick to come and work with him on an important and “very secret” job in Los Alamos, New Mexico. Ulam would see that Dick got a government grant and earn his Ph.D. in mathematics. Dick said he would consider it, as he admired Ulam a lot. That same night Ulam had been rushed to the hospital with encephalitis. Dick visited him in the hospital, met his wife, and had a long talk with him. Dick told Ulam that he

A class of public school children and their teacher beneath the Canton Planetarium dome, 1950.

Emmons stands at the console of the Morehead Planetarium at the University of North Carolina in Chapel Hill, where he was Program Chair and Head Lecturer in 1951-52.
did not want to go to work in Los Alamos, especially if he could not then know the nature of the job to which he was invited.

Dick never saw Ulam again. A substitute instructor finished teaching the math course. Much later the “secret project” was revealed to be the atom bomb, to which Ulam made pivotal mathematical contributions. Unknown to my father, Ulam had been commuting back and forth from California to New Mexico, working with Teller, when he was teaching the class Dad took with him. Ulam had gone to be in Los Alamos full time after his encephalitis. My father always was glad that he did not say yes to Ulam’s request; a few weeks after the conversation, Dad completed his B.S. at the University of Southern California.

Emmons’ planetarium contributions began in 1949 while teaching astronomy and physics at the Canton, Ohio, campus of Kent State University. With his students he constructed his first small planetarium in his classroom, with supplies costing $100 and with a small grain silo for a dome. Having made many telescopes, creating a planetarium did not appear too difficult to him.

With a passion for astronomy education, Dick thought there was no reason that planetariums needed to be restricted to large institutions. He took 15 of his astronomy students to the Buhl Planetarium in Pittsburgh to understand what a planetarium could do to aid understanding of astronomy, and he urged the students to help him build a planetarium for their classroom. Dick excited the students about having their own small laboratory in which the celestial sphere, the stars, and other earth-based observations could be visualized and understood. Dick and the students completed the entire construction project in less than six months. The facility was a “star” both on campus and in the Canton area. About sixty presentations were made from December-May, 1949-50, to about 1500 young people from the Canton Public Schools and Kent State University.

Dad remembered one fourth-grade teacher who brought her group to that planetarium in 1950. As always, he adapted his live programs to the age level of his audience. He included the Big and Little Bears and their myths, but he also did what he called “some serious teaching.” He discussed the extent of space and the concept of a light year. He pointed out the Andromeda Galaxy shown as a fuzzy spot in the Canton Planetarium sky, going on to explain that we see that galaxy by light that left it long ago. After a dawn and sunrise, with recorded music, there was a lively question period with the eager fourth grades. Then, wrote Dad,

“While these little people joyfully skipped out of the room, having clearly enjoyed themselves, their teacher approached me as though she were in a state of shock! ‘Oh, Mr. Emmons,’ she implored, ‘Do you think it right to subject these young minds to these overwhelming thoughts? But like water running of a duck’s back, these kids were not at all overwhelmed. I found this incident revealing. Apparently some adults have great difficulty coping with astronomical ideas where some be unlearned.”

Dick used the Canton Planetarium as the focus of his 1950 M.A. thesis. He wrote the first graduate-level thesis about small planetariums: A Report on a School Planetarium: Its Design, Its Development as a Group Project; Its Utility as an Instructional Aid; and Its Program in School Community Relations.

Dad did not know Armand Spitz, creator of a company producing planetariums, when he built his planetarium and wrote his thesis. The two men met an AAS meeting in Cleveland in 1951. They discussed Dad’s thesis and planetarium project. Spitz borrowed the thesis and wrote back to him:

“... you have done a superlative job and you have expressed very satisfactorily, not only the problems involved in setting up a planetarium project, but you have gone directly to the core of the educational and cultural advantages of such an activity in an educational institution ... (you are) one who visualized and solved almost insuperable problems in the interest of offering a worthwhile teaching adjunct.”

Armand Spitz preceded my father in the concept of the small planetarium, although my father was developing his own ideas for the small planetarium just a few years later, as Spitz was starting to sell them. Armand Spitz had a brief but important role in recruiting SAO Moonwatch observers in this period, but my father had no contact with Spitz about this activity or during the SAO Moonwatch period of 1956-1975, in which Dick was so highly involved. Spitz admitted that he, Spitz, did not have interest or skills needed for data reduction, being a journalist and having not finished college, so he left the Moonwatch project. Spitz, whose small
planetarium business was growing, asked Dick if he could copy his thesis and other materials by Dick so he might pass them on to people who were buying Spitz planetariums; Dick provided them.

For his first planetarium projector in Canton and for subsequent planetarium projectors, Dick hand-drilled each star hole in an Earth globe, providing pin-hole projection. The first was an old cardboard library globe, but his later globes were metal. No transformation coordinates were needed between holes and stars’ right ascensions and declinations, as required for Spitz A dodecahedrons. Using the longitude and latitude lines on metal globes as a guide for right ascension and declination, the stars were plotted. About 500 stars were drilled into the globe, carefully selected to include the key stars recognizable in constellations. All Dick’s stars were different sizes for different brightness; no lenses were used. Like the current STARLAB and other portable planetariums, larger holes drilled at regular intervals around the ecliptic could be uncovered for the correct position of the sun or the moon. A fully open hole could be the sun or the full moon. A round adhesive mask, partially covering the hole, produced different moon phases. An adhesive mask with a hole a little larger than a bright star hole projected a dot representing a planet. For moving planets and satellites, Dad made special projectors. His “Star of Bethlehem” program utilized a clever pulley system to demonstrate the triple conjunction of Jupiter and Saturn. Dick motorized the star ball and used a slip ring apparatus to keep wires from twisting.

In his Canton planetarium, a silo top was used as a dome. Since the silo top was not perfectly round, masking tape was used to cover the depressions. The inner surface was painted to conform to a projection screen. Along the lower rim of the dome, the black silhouette of city buildings was added to represent the horizon. The dome was supported by six braces which were attached to the floor.

As I grew up, I heard Dad’s conviction repeatedly: As an aid to visualizing many astronomy ideas and motivating people to learn astronomy and related subjects, the planetarium is second in technological importance only to the motion picture – first films, and then video. As he promotes in his 1950 thesis, “Physics, mathematics, geography, navigation, engineering, mythology, history, and philosophy” all can benefit from demonstrations that can be done in the planetarium. This philosophy became mine. When I became a planetarium director in Canton, from the start I gave interdisciplinary programs for a variety of different high school classes along with elementary programs and public shows.

After the Canton regional campus of KSU was closed in 1950, because a levy for funding was turned down by Canton voters, my father sought another planetarium position. He wrote a letter to Roy K. Marshall at the then-new Morehead Planetarium of the University of North Carolina in Chapel Hill, North Carolina. Morehead, with its large Zeiss projector and 500 seats, was a very different venue from the homemade Canton Planetarium. Dick’s letter of inquiry and application to Marshall was characteristic of his aggressive honesty and modesty: “My background for such a position, I believe, is adequate. My enthusiasm for teaching astronomy is probably not surpassed by 100 people in this nation!”

As Roy K. Marshall left the Morehead Planetarium in 1952, Technician Tony Jenzano was searching for a new Program Chairman and Head Lecturer. My father was offered and took the position. After working there for several months, waiting for our North Canton house to sell, his father died suddenly. Dick had a growing conviction that by promoting and using a small planetarium, he could do more for astronomy education than he could at the palatial Morehead. And he needed to go back to Ohio to help his mother with the estate. Dick left Morehead with the sun, moon, and planets, as well as the view of the sky from North Canton where my grandfather died, set for the moment of my grandfather’s death. Tony Jenzano then became the Program Chairman and Head Lecturer, holding that position for many years.

While Dick went back to Goodyear Aerospace, where he had worked for two years after the Canton campus of Kent State University closed before taking the Morehead appointment, the original planetarium projector from Canton was put back into use. It became the projector of the planetarium called “The Star Barn,” a one-car garage behind our home in North Canton. After one year, Dad had the one-car garage replaced with a two-car garage. This new building prompted a name change. It was now “The North Canton Planetarium.” The larger space held the same planetarium projector but a larger dome, made from a parachute by my mother with her sewing machine, placed over aluminum spokes cut and bent by my father, and a variety of small exhibits and
If the stars should appear one night in a thousand years, how men would believe and adore and preserve for many generations the remembrance of the City of God. One might think the atmosphere was made transparent to give Man the perpetual presence of the sublime. – Ralph Waldo Emerson

My father hired high school students to present taped planetarium presentations during the day, since he then was working during the day at Goodyear Aerospace. For one year I was one of the high school presenters. My mother was receptionist, taking school reservations. On our quiet residential street, buses would stop in front of our house, and children in first through eighth grades would file into the garage-style North Canton Planetarium. Our neighbors got used to it. Between 1953 and 1963, over 20,000 paying visitors attended the North Canton Planetarium, in addition to a very large number of guests and Moonwatch trainees. In both a near pre- and post-Sputnik Era the North Canton Planetarium filled an important need.

To schools, my mother mailed leaflets with the heading, “The North Canton School of Astronomy,” and a list of “abilities and understandings to be developed” by each of six different programs.

- Earth’s rotational effects speeded 500 times.
- Planetary motion showing a month’s changes in 1 minute
- Stars in transit across the meridian, rising, and setting.
- Appearance of a meteor, comparing it with true stars
- Discovery of a nova.
- View of a total eclipse of the sun.

From September 7-10, 1958, the first symposium for small planetariums took place at the McMath Planetarium of the Cranbrook Institute of Science in Bloomfield Hills, Michigan, and my father was one of the 101 participants. Actually I was the 102nd, but I was not formally registered (and I did not pose for the group picture). My father had the foresight to excuse me from school for one of the most influential experiences of my life. It was a time when the accepted plural for planetarium was planetaria, as reflected in the name: Planetaria and Their Use for Education.

For my father, I presented “The Autumn Stars,” one of his taped programs. I remember some of the discussion that followed, not all of which made it into the Proceedings. A number of people were impressed that a taped program worked, with the implied fact from my age that almost anyone could give it. My father and one other attendee enthusiastically promoted the taped program in the face of very animated and widespread opinion that taped programs were strictly second-class, to be used only in an emergency. I find it ironic that now so many planetariums, large and small, use taped programs at least part of the time.

Also at that meeting Dick presented a paper on how to give a program on observing artificial satellites, with his homemade satellite apparatus, “Satellite-Tracking Practice in a Planetarium.” Similar to the situation of large planetariums later being used to train astronauts, the North Canton Planetarium was the nerve center for training the Akron-Canton Moonwatch group, covering such pertinent topics as celestial sphere, coordinates, constellations, and star-hopping. An additional remembrance of the Cranbrook meeting is that my father arranged for me to have a long conversation with Armand Spitz.

In the early 1960s a new museum, the Stark County Historical Center, was planned for Canton, Ohio. Dick encouraged the inclusion of a planetarium with a Spitz A-3-P projector. He served as the coordinator/consultant for all phases of operation of the Hoover-Price Planetarium until I could become its first director. The era of the North Canton Planetarium came to an end, although my father continued to use the planetarium for satellite team training.

Between 1953 and 1996 Dick drilled 17 sep-
arate pinhole projectors, with additional projector parts added by my brother Tom, which were sold as “T.S.A. Planetarium Projectors.” When he retired from his Goodyear Aerospace job in 1971, he again began teaching college astronomy and physics, and he constructed another classroom planetarium at Kent State University, Salem Branch.

Some of Dick’s other planetarium “star balls” are located in Ohio, New York, Illinois, Maine, Tennessee, Texas, Minnesota, Kansas, and Iowa. One is in England.

In his letter to the purchaser of his last “T.S.A.” projector, Roy Gustafson of Orion, Illinois, he wrote,

"Here is the last “T.S.A.” starball, with my etched signature near the south pole, as you requested ... The TSA uses a 3-cell flashlight bulb, selected for a small filament, with a rheostat to control brightness. The room must be quite dark, and the audience eyes, dark adapted. Your dome should not exceed 14 feet [4.3 meters]... I hope that the physics department at Cole College still has its TSA projector. If so, you can there examine how the starglobe was mounted. Especially note the rocker mount for the light source and the horizon cutoff. Also note the skylight reflector.

Until he became ill with cancer last spring, Dick continued observing satellites. He was particularly interested in tethered satellites, two satellites at different altitudes connected by a tether. He wrote

“It seems incredible that we can see the tether, which is only 0.080 inches [2 mm] wide, but we can. The many glints of light along its 2.5-mile [4-km] length are integrated by the eye and brain to appear as a continuous line, a phenomenon very much like the one that made Percival Lowell think he saw canals on Mars.”

Dick also was fascinated by the geostationary satellites at W. 103° and W. 105° longitude with their transits across M11. He saw his “pet rock,” asteroid 5391 Emmons, in 2002, with the help of Wilderness Center Astronomy Club members. Said David Ross, a member of the club interviewed for a feature article in The Akron Beacon Journal after Dick died, “He was a very open person, a kind and gentle man who had a profoundly willing spirit of enthusiasm. He was an inspiration to many of us.” Ross also remarked, "A bright light has gone out in the firmament."

The following words by Astronomer Maria Mitchell seem to express my father’s convictions in his work as an astronomy educator and planetarian,

Small as is our whole system compared with the infinitude of creation, brief as is our life compared with the cycles of time, we are so tethered to all by the beautiful dependencies of law, that not only the sparrow’s fall is felt to the uttermost bound but the vibrations set in motion by the words that we utter reach through all space and the tremor is felt through all time.

An annual award, the Richard H. Emmons Memorial Award has been established with the Astronomical Society of the Pacific (ASP) for College Astronomy Teaching for Nonmajors. A Wilderness Center Astronomy Club scholarship for a graduating high school senior interested in astronomy also has been created in his honor. A bronze plaque noting Dick’s contribution to astronomy and the asteroid bearing his name are for a time on display at the Wilderness Center Observatory, Wilmot, Ohio, with a memorial exhibit; later the plaque will be reposited on his grave. The gravestone of Richard H. and Phyllis M. Emmons is inscribed, "We lived when men first walked on the moon.” The granite stone is engraved with a picture of the gibbous Earth above a lunar landscape, with footprints.

A plaque noting the naming of an asteroid, Emmons 5391 for his astronomy research and education, is part of the Wilderness Society Astronomy Club Emmons Memorial Exhibit at their observatory in Wilmot, Ohio.

Emmons with one of his many telescopes, about 1995. Emmons continued to observe satellites until the spring of 2005, with particular interests in geocentric and tethered satellites.
IPS Statement on the Ancient Age of the Earth and Universe

Many independent lines of scientific evidence show that the Earth and universe are billions of years old. Current measurements yield an age of about 4.6 billion years for the Earth and about 14 billion years for the universe.

How ages are measured

The age of the Earth is measured by studies of radioactive elements. Radioactive elements are unstable and “parent” atoms decay into other “daughter” elements at a steady rate. For example, through a series of steps, atoms of uranium decay into atoms of lead. By measuring the abundance of “parent” and “daughter” atoms in rock samples and knowing the decay rate, geologists can calculate the age of the rock. Using several different sets of parent and daughter elements, geologists have measured the age of a variety of rocks, including terrestrial and lunar rocks as well as meteorites, which originate primarily from asteroids. The results consistently indicate an age of about 4.6 billion years for the Earth.

The age of the universe is measured in several ways. One method is based on the rate of expansion of the universe. By measuring the distance to remote galaxies and the rate at which they are expanding away from us, astronomers can calculate how much time the galaxies have needed to get as far away as they are. This tells how long the universe has been expanding, or how old it is. These studies yield an age of about 14 billion years.

The age of the universe can also be determined by investigating the oldest clusters of stars. This is done by measuring the brightness and temperature of stars in a cluster and comparing those measurements with models of how the brightness and temperature of a star change as the star ages. It is somewhat like estimating the age of a person by looking at features of his or her face and knowing how our faces change as we age. These studies show that the oldest star clusters are about 12 billion years old. The universe must be older than its stars, so this method establishes a minimum age for the universe. Similar studies show that the Sun is about 5 billion years old, consistent with the age of the Earth measured by radioactive studies.

A third way to determine the age of the universe involves measuring the ages of long-lived dying stars. As stars like the Sun age, they eventually become very small, faint objects about the size of the Earth. These stellar corpses are called “white dwarf” stars and have no remaining sources of new energy. Astronomers can calculate the rate at which white dwarfs get fainter and cooler, so when they then measure the brightness and temperature of a white dwarf star, they can recognize how old it is. These studies show that the oldest white dwarf stars are at least 10 billion years old. As above, this establishes a minimum age for the universe since the universe must be older than its stars.

Why these measurements are accepted by the scientific community

These measurements of age are accepted by nearly all astronomers, including both research astronomers and planetarium educators. These astronomers come from nations and cultures around the world and from a very wide spectrum of religious beliefs.

A fundamental reason why these ancient ages are so widely accepted by the scientific community is that they are derived from several independent lines of evidence accumulated by independent and often competing teams of researchers. Each method involves different measurements and the application of different physical principles to derive ages from those measurements. The physical principles include the same thoroughly-proven principles that underlie the technology that runs the modern world. Hence the fact that the independent methods all yield similar ages reinforces confidence that the methods are sound and accurate despite their complexity and do not contain major fundamental flaws.

A second reason why these ages are so widely accepted is that for scientific results to be published in research journals, they must be critically reviewed by other scientists who are experts in the same research area. This process is called peer review and is employed in nearly all research journals in the physical and biological sciences and in the humanities and social sciences. Often the reviewers are competitors of the author and thus are especially keen to find flaws in the proposed publications. As a consequence of such review, nearly every paper must be revised and improved before it is published, and some papers are rejected because the review exposes flaws in the measurements or in their analysis and interpretation.

A third reason why these ages, and other scientific paradigms such as Einstein’s theory of relativity, are so widely accepted is that by the nature of its acquisition—through independent lines of evidence and always subject to scrutiny—scientific evidence is built up only very slowly, one step at a time. Only when a very large and diverse body of evidence has been accumulated is a broad conclusion accepted. Even then, a broad conclusion remains subject to inspection, as further evidence may reinforce or refine it, or in rare cases, overthrow it.

Conclusion

Evidence that the Earth and universe are billions of years old is based on diverse lines of research that have been rigorously examined and which yield concordant results. Therefore, IPS accepts that these results provide an accurate description of our universe.

Planetariums are based on science and education and as such reflect the ideals and principles of these disciplines. Planetarium educators seek to present both scientific evidence that the Earth and universe are billions of years old and which yield concordant results. Only when a very large and diverse body of evidence has been accumulated is a broad conclusion accepted. Even then, a broad conclusion remains subject to inspection, as further evidence may reinforce or refine it, or in rare cases, overthrow it.

Related statements

The American Astronomical Society has a statement on the age of the universe on its web site at http://www.aas.org/governance/council/resolutions.html#create. It has also, in conjunction with the Astronomical Society of the Pacific, published a booklet An Ancient universe: How Astronomers Know the Vast Scale of Cosmic Time. This booklet is available in PDF form at www.aas.org/education/ancientuniverse.html.


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**Hy’brid**, n. [L]

1. Strictly defined, an offspring that is a cross between different species, genera, or, in rare cases, families.
2. The result of the union of two distinct species; an animal or plant produced from the mixture of two species.
3. Something made up of a mixture of different components
4. What all planetariums should be from this day forward.

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**GOTO USA**
Ken Miller
Toll-Free: 888-847-5900
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FAX: 808-597-8662
E-Mail: gotousa@earthlink.net
General Counsel

Christopher S. Reed
CSR Media, LLC
12106 West 75th Lane
Arvada, Colorado 80005-5306 USA
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Contract Law & Performance License Agreements

As commercially distributed planetarium shows have become more and more sophisticated, an increasing number of show distributors have started requiring purchasing institutions to enter into performance license agreements that govern the terms and conditions by which the show may be presented to audiences. While most of us view these agreements as mere formalities that receive only cursory glance, understanding these agreements is critical when it comes to knowing what a purchasing institution may and may not do with the show materials.

Despite the fact that the transaction looks and feels like a sale, planetarium shows are rarely sold outright. The "purchaser" is actually a licensee which, in return for payment of a license fee, receives permission from the producer (the licensor), to do certain things with the producer’s content. The contract that governs the rights of each party is called the license agreement. Because a license agreement is simply a type of contract, this installment of General Counsel begins with a primer on basic contract law and then walks through some basic provisions that appear in many planetarium performance license agreements.

Contract Law Basics

Behind the legal jargon that tends to accompany most written agreements, a contract is fundamentally just a promise or collection of promises that can be legally enforced between the parties. A valid contract has four key elements: offer, acceptance, consideration, and sufficient definiteness. The first two, offer and acceptance, are often lumped together and referred to simply as a "meeting of the minds." That is, an enforceable contract cannot exist unless the parties involved actually understand and agree to the transaction set forth in the agreement.

The third requirement for a valid contract, consideration, simply requires that there be some sort of bargained for exchange between the parties. In a typical contract that generally means that one party is paying for the products or services of the other party. There is, however, no requirement that a transaction involve money. Two parties might enter into a barter arrangement whereby one party provides certain items in return for the services of the other party. Assuming the other requirements for a valid contract were met, such an agreement would be enforceable. Finally, the fourth requirement, sufficient definiteness, simply requires that the contract be presented in such a way that both parties clearly understand the rights and obligations of one another such that they can be performed.

Once a legally enforceable agreement has been entered into, the parties are bound by the terms and conditions to which they agreed. Any deviation from such terms is considered a breach of the contract which may subject the offending party to pay damages, that is, certain financial penalties to compensate the non-breaching party for losses that arise out of the breach. In many cases, the consequences of a breach are actually written into the contract. In situations where the contract is silent on such matters, various legal principles help the parties determine the appropriate result. Fortunately, the majority of contract disputes never make it to a dramatic made-for-TV trial; instead the parties usually work out a new arrangement that is mutually beneficial to both parties.

It is important to note that contract law is state law, and that the interpretation of contracts may vary from state to state. Fortunately much of it has been standardized to such a point that the basic principles are the same regardless of which state law governs a particular agreement. That said, the potential for differences among states highlights the importance of seeking the advice of a licensed attorney in the case of questions in this area.

Why Do We Even Need an Agreement?

While performance license agreements are fairly commonplace in many industries, it seems as if license agreements are a fairly recent phenomenon in the planetarium community. I believe the reason for the recent proliferation of such agreements is the rapidly increasing complexity of planetarium productions. Shows that once were prepared entirely in-house are now comprised of elements from numerous third-party providers.

A contemporary show producer might have contracts with dozens of visual artists, graphic designers, narrators, composers, writers, advisors, and other professionals. Each of these contracts contains its own unique obligations that the producer must adhere to. In order to ensure downstream compliance, the producer then incorporates these restrictions into its own agreement with presenting institutions. An artist may, for example, create and license certain works for use in a specific show; use outside of the show would require additional permission from the artist. To ensure that the use of the artist’s work remains true to the original agreement, the producer must impose the same restrictions on its licensees, and the easiest way to do that is by way of a written license agreement.

Performance License Agreements: Basic Clauses

With a basic understanding of the law that underlies contractual relationships, we can move forward to discuss some key provisions that appear in typical planetarium show performance license agreements. The first and arguably most important clause in such a license is known as the grant clause, which allows the licensee to exploit the
copyrighted work in such a way that would otherwise only be allowed by the copyright owner. Grant clauses can be narrowly crafted to provide only specific rights under certain circumstances.

A typical planetarium show license grant should, at a minimum, include the right to publicly perform the show within the presenting institution’s facilities. It may also be desirable to obtain synchronization rights from the producer, which would allow the presenting institution to add material to the show. Note that a license to publicly perform materials within the planetarium does not immediately grant the planetarium rights to use show content in marketing and advertising materials. In order to engage in such use, specific rights must be granted in the agreement.

As with all contractual rights and obligations, a grant clause can be conditioned upon or limited by certain terms. A license agreement may, for example, limit the performance a particular show to only school groups, or require that the presenting institution include all of the show’s credits and copyright notices. Though we have yet to see such complexity in planetarium license agreements, many commercial film exhibition licenses restrict the performance of films to specific time windows, and often include strict limitations on theater quality, cleanliness, and accessibility.

One word of warning regarding license grants: Most well-written licenses include what is known as a rights reservation clause, which essentially provides that all rights which are not expressly granted to the licensee are retained by the copyright owner. This means that you get only what is included in the license – no more, no less. Exemptions and defenses that may be otherwise available to a user of copyrighted materials, like fair use and the classroom exemption, cannot be claimed because those rights were not expressly granted to the licensee in the agreement. In short, by entering into a performance license agreement you have, in essence, waived such rights. Of course, every agreement is different, and this is an area where the law is so complex and diverse that it is impossible to address all possible scenarios in a short article. Accordingly, consultation with your own counsel is essential if you are ever faced with a question relating to the extent of your rights under a license agreement.

Beyond the grant clause, the next most important aspect of a performance license agreement is the royalty or fee clause which provides for the amount that the licensee will pay in return for the rights granted in the agreement. Currently, most planetarium show licenses are based on a flat fee, which is one reason why buying a show package feels like a purchase rather than a licensing arrangement. As programs become more complex, and thus expensive, it is conceivable that we may see producers start to adopt a running royalty model. Such a framework would allow for more flexible pricing of show materials: a producer might offer a per-showing license fee with different rates for different audiences (school groups versus public shows), or a flat time-specific license fee, allowing unlimited showings during a particular window of time.

No license agreement would be complete without a term clause which provides for the duration of the agreement. Like the grant and royalty clauses, the term clause allows for some customization and flexibility should the parties to the agreement desire. Generally, the term of a typical planetarium show license is perpetual, granting rights to the presenting institution for an indefinite period of time, again, making a licensing arrangement look and feel as if it is an outright purchase. Otherwise, the term clause is specified a period of time, usually in terms of years, after which the license expires.

Closely related to the term clause is the termination clause which governs situations in which the agreement may be terminated before the specified term. While the parties to an agreement may identify virtually anything as a termination-triggering event, the most common in license agreements simply involves the licensee’s use of the licensed materials outside the scope of the grant clause.

Most agreements also include a transfer or assignment clause which specifies the conditions, if any, under which the rights granted to the licensee may be transferred to another party. Except for a few specific circumstances, absent specific prohibitive language in the agreement, most contracts, including license agreements, are freely transferable. Most planetarium show licenses, however, expressly prohibit such transfer.

In addition to the substantive clauses that define the conditions under which a planetarium show may be used, most license agreements include a variety of boilerplate clauses which tend to appear in most contracts. The choice of venue/forum and choice of law provisions govern where a dispute may be adjudicated and the law that the court will apply. Planetarians at state-owned institutions should be mindful of the fact that many state governments are prohibited from entering into agreements that are governed by law other than its own.

Standard contracts also generally include an indemnity clause which determines who pays the legal bills and any other associated costs in the case of a breach or other events that are specifically enumerated in the contract. Most contracts also include a warranty disclaimer clause which disclaims certain warranties which, absent the specific contract language, would arise automatically by operation of law upon the licensing of the intellectual property. Finally, a no waiver clause provides that even if the copyright owner decides not to enforce certain provisions in the contract, it has not waived its rights to enforce the clause in the future.

Conclusion

While the recent shift to requiring signed license agreements may seem like an unnecessary complexity, the use of carefully crafted licenses is necessary to ensure that the intellectual property rights of the producer and its contractors are sufficiently protected. On a more practical note, the move from a traditional “purchase” distribution model to one based on more comprehensive licensing arrangements will allow producers to better design pricing and rights frameworks that better reflect the economic value that is derived from commercially distributed show materials. As license agreements become the rule, rather than the exception, to acquiring new shows and multimedia content, it is important to recognize the value of fully reading and understanding the terms and conditions upon which such materials are used. As always, should questions arise, it is essential that you consult an attorney to fully understand your rights and responsibilities.
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Europe:
Sky-Skan Europe GmbH
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Germany
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Reviews

Four books to offer this season, gentle readers... something for the teachers among us, as well as the observers, the historians, and the fireside readers.

Does anyone out there want a free astronomy book? How about some software? Contact me at the address(es) above, and I’ll let you know what’s waiting for a reviewer. (The catch, of course, is that you have to write a review.)

Thanks to our reviewers for this issue: Dave Hostetter, Francine Jackson, Steve Tidey, and Richard Monda.

Earth in Space: Student Guide and Source Book

 Reviewed by Francine Jackson, URI Planetarium, Providence, Rhode Island

I was introduced to this book at a science teachers’ “pick-apart” session, where teachers analyze texts and play with/critique a few selected activities. Some of you might already be using this book, but for those of you who are new to this (as I was), it is part of a modular concept in education, from the National Science Resources Center, the Smithsonian Institution, and The National Academies. As one set of the Science and Technology Concepts for Middle Schools, Earth in Space is geared toward grades 6-8, according to the web site.

The book is divided into three sections: Part 1 is the Sun-Earth-Moon System. Here we are introduced to everything from thinking of the Earth as a planet, the Sun as a giver of light and energy, seasons, Moon phases and eclipses, even analyzing sunspot data. Part 2 contains the Solar System, including crater formation, weather patterns on varied planets, gravity, and tides. Part 3 comes back to Earth, with excavating fossils, studying asteroid impacts, and comparing it to the rest of the neighborhood.

With each topic is an “Inquiry” with related activities. For example, in “Tracking Shadows,” students follow the path of the Sun’s shadow through the course of a day. They later simulate the change in height of the Sun for the differing seasons. Then, after that is a sketch of a giant eyeball, to remind the student to view the Sun safely, as opposed to damaging the eye.

In all, I found the book a terrific idea – wish I could convince college administration to use something like this – and many of the advisors are, for us, household names.

In all, I found the book a terrific idea – wish I could convince college administration to use something like this – and many of the advisors are, for us, household names.

Investigating the Moon’s reflected light was great, but the setup could never be done in one class period, which appeared to be the goal of each procedure. The above experiment, “Tracking Shadows,” doesn’t go the next step – telling time. And one of my favorites, a scale model of the solar system, just didn’t work out as planned.

But, as a whole, it was very informative, especially to those who teach at this level. Most of the experiments were relatively simple to do; we even got to play with an old favorite tool, a radiometer (not the best that day because it was snowing like mad outside); most diagrams were very useful; and, of course, the space images were beautiful. It was also unique in that it actually helped to show that science is a real part of life. This is the first text for that age group that I’ve seen that introduced, for example, the Anasazi as Skywatchers, a table of 2½ centuries of sunspot data, and a good treatise on Newton’s laws. If you are teaching at this age level, you might want to keep this book in mind, if not as your primary, definitely as a great complement to any lab manuals you may be using.

New Moon Rising: The Making of America’s New Space Vision and the Remaking of NASA
Frank Sietzen and Keith Cowing, Apogee Books, Burlington, Ontario, Canada, ISBN 1894959124. US$33.95, CAN$44.95, UK £23.93


In all, I found the book a terrific idea – wish I could convince college administration to use something like this – and many of the advisors are, for us, household names.

“Have a mandate”
For me, those are the most significant words spoken by a NASA Administrator since the glory days of Apollo. They were uttered by Sean O’Keefe on January 14, 2004 in response to President Bush’s Vision for
Space Exploration (VSE) announcement, the video of which is on a CD that accompanies Sietzen’s and Cowing’s meticulously researched and thoroughly readable book. The authors are both well-connected in Washington and space advocate circles, and so they are well-placed to detail how the Agency has changed its arcane culture over the last few years to lay the groundwork for getting back to the Moon and on to Mars. They show clearly how the lack of a corporate vision has stymied the Agency over the last 30 years, leading to numerous wasteful research programs that went nowhere because the staff didn’t know where they were going in the first place. On page 232 a NASA employee is asked why the VSE is different from many other programs we were supposed to get excited about over the years. He replied, “This time we have a vision.”

Many sectors of NASA were slow to welcome the VSE, and some still are because cutbacks to pay for it are radically curtailing traditional research studies. But apparently the many people who are working on the day to day detail of translating the President’s words into reality now have a gleam in their eye for the first time in many years.

The authors begin by detailing the final years of Daniel Goldin’s time as Administrator. He doesn’t fare well, coming over as egotistical, long over-staying his welcome, and someone whose management style was the opposite of what would shortly be needed to transform NASA from the top down.

I wasn’t the biggest fan of his successor, O’Keefe, but my attitude to him has changed after reading this book, as he clearly was the right person at the right time to pull NASA back into shape. I hadn’t realised how disjoined the Agency had become under Goldin. As an example of O’Keefe’s different style, immediately following the Columbia disaster he instructed his management team to be completely open with the media about the mistakes the Agency had made in the years leading up to the explosion. He wanted to change the counterproductive NASA culture of circling the wagons in times of crises and not letting the public have information to which they were entitled. This new policy ensured NASA had a strong, trusting relationship with the families of the Columbia crew, none of whom issued any lawsuits, unlike the families of the Challenger victims.

In plain PR terms, O’Keefe changed Goldin’s credo of “better, faster, cheaper” to a more responsible, “affordable, sustainable, credible.”

The authors suggest that the top NASA brass were thinking about a big, new space exploration coup to counter the heartache of Columbia at about the same time as a White House group of space enthusiasts, which initially met in secret as the Splinter Group to thrash out ideas. After a few months NASA chiefs were invited in and soon it became the Rump Group, which got the nascent, rough and ready VSE idea off the ground and into a broad outline that could be officially forwarded to the Oval Office for comment and expansion.

Following President Bush’s historic press conference, O’Keefe realised that to have any realistic hope of getting the Vision off the ground, he would need to institute not simply a corporate reorganisation (that would simply move the existing furniture around) but would need to transform the Agency. The ‘furniture’ had to be redesigned and put in different rooms. NASA needed to be brought, kicking and screaming, into the modern world of private industry management techniques. (Shock, horror, probe.)

While he set about doing that, Congress and the Senate were getting a little antsy about not having enough detail behind the Vision to sign off on it and pass the initial $500-million of extra funding NASA would need in the first financial year. (In fairness to O’Keefe, the authors remind us that after President Kennedy’s announcement to go to the Moon, it took NASA 16 months to decide on the Lunar Orbit Rendezvous technique.)

O’Keefe came in for heavy criticism from all quarters for the lack of rollout detail. But, as the authors correctly point out, he was caught in an awkward position because President Bush didn’t agree to go ahead with the Vision until about a month before the announcement, and that didn’t leave enough time for the detail we all craved to be sorted out. So if O’Keefe had allowed his team to secretly do the detail before the announcement, and Bush heard about it, the Vision may have been cancelled by the White House at birth because O’Keefe would have been seen as being too optimistic and presumptuous about the President’s wishes.

One of many memorable scenes in The West Wing television program is one in which President Bartlett’s Chief of Staff says, “There are two things you don’t want to see being made - sausages and laws.” I thought of that quote as I read the chapters which cover in great detail all the Senate and Congressional hearings that O’Keefe had to go through to satisfy the lawmakers that the Vision had substance. There’s still skepticism on Capitol Hill today, but in the time since the book was published (Autumn 2004) a glance at NASA’s dedicated VSE Web page (http://www.nasa.gov/externalflash/Vision) indicates that huge strides have been made in firming up the Vision’s ‘architecture’.

It was fascinating to read the extent to which O’Keefe’s decision about canceling the last shuttle servicing mission to HST (announced the day after the VSE press conference and unconnected) caused him grief on Capitol Hill, so popular is HST there. It consequently lost him some of the momentum the VSE announcement had created, making it more difficult to get politicians excited about the Vision.

A telling comment about the VSE comes in the form of a quote the authors use from Norman Augustine, an aerospace consultant, who said, “If we are to pursue an objective that takes 20 years to achieve, that implies we must have the support of five successive presidential administrations, ten successive Congresses and 20 consecutive federal budgets – a feat the difficulty of which seems to eclipse any technological challenge.” The authors suggest there’s enough political goodwill at the moment to at least see the Vision through its first few years.

There are some silly little typos and spelling mistakes that mar this book’s production quality, but the accompanying CD contains large amounts of marvelous video animation showing how many aspects of the Vision may end up looking. It’s still too early to take it all at face value. Assuming this stuff is free to use, you’ll find it invaluable in giving your patrons something to look at that makes the VSE feel more real to them. And it won’t hurt to also recommend this book as a fine account of how NASA has finally found its reason for being after 30 years in the wilderness.

**Stargazer: The Life and Times of the Telescope**


Reviewed by Dave Hostetter, Lafayette Natural History Museum & Planetarium, Lafayet,te, Louisiana, USA

Dr. Fred Watson is the astronomer-in-charge of the Anglo-Australian Observatory at Coonabarabran, New South Wales, Australia, and a man who in his own words leads a

Watson covers the period leading to the invention of the telescope quite well. He spends quite a bit of time with Tycho Brahe, and he compares Tycho’s style of operation with the role of the director of a modern observatory or scientific institution. Although when and by whom the telescope was first invented is still controversial, *Stargazer* does an excellent job of putting that event into the context of astronomy history from claims about ancient lenses to descriptions of devices that sound vaguely like telescopes by Roger Bacon, Leonardo da Vinci, and a variety of opticians in the 1500s. And yes, Tycho is there again with his equatorial mount.

...Watson’s book provides a light and enjoyable read about early telescopes and the birth of aperture fever.

The actual invention of the telescope is handled well, too. The introduction of the telescope to the Dutch is placed in the context of their war with the Spanish, and clearly a device that allowed Dutch forces to see enemy forces at a distance was a distinct advantage. The telescope was introduced by Hans Lippershey, and the story of his attempt to patent it details the claims and counterclaims made by a variety of opticians also interested in getting the patent. This could all be pretty dry stuff, but Watson makes it read as entertainingly as a novel.

Most planetarians with even the most passing interest in early telescopes have probably seen images of the extraordinarily long focal length instruments that were made in the late 17th century. Hevelius made one as long as 46 meters (150 feet), for instance, while Huygens made one measuring about 64 meters (210 feet). Incredibly, the latter instrument had no tube at all — the objective lens and eyepiece were connected by nothing more than a string pulled taut, and the observer was supposed to align them by hand! It’s amazing that anyone could see anything at all through these “dinosaurs,” as Watson calls them, but these were the instruments that were used to discover some of the moons of Jupiter and Saturn, study the rotational period of Mars, and of course, discover Saturn’s rings. In an era when nearly anyone can use computerized telescopes that are barely more than toys to find objects that would have astounded 17th century observers, the sheer persistence and determination of those early astronomers is startling to contemplate.

Did you know that studies of reflecting telescope designs go back a half century before Newton? That the first telescope with a segmented mirror — that staple of today’s gigantic reflectors — was made by Lord Rosse using speculum metal segments before 1840? Or that the last large telescope to use a speculum mirror, built in 1866-68 by Thomas Grubb, was still in operation (although with a much modified structure and a more modern mirror) into the 21st century, and ultimately was lost in the terrible fires that destroyed the Mt. Stromlo Observatory in 2003? The stories behind these instruments, their makers, and the astronomers who used them make *Stargazer* a fascinating read.

*Stargazer: The Life and Times of the Telescope* may not be a book that just anyone would enjoy, but it would be very good for those who love telescopes and the sky, and who share the author’s “star-struck life.”

**The Planets**


Reviewed by Richard Monda, Albany, New York, USA.

If you like your science served up with soft centers, then Dava Sobel’s latest book, *The Planets*, is for you. Making her mark as a *New York Times* science reporter turned independent writer, Sobel provides us with a mix of astronomy, history, mythology, and alas, even astrology, as she takes us though a light and fluffy journey from the interior of the sun out to the depths of our solar system.

Sobel, author of the best-selling book, *Longitude*, a work that detailed the story of England’s eighteenth century quest to accurately determine meridian lines at sea, and the narrative, *Galileo’s Daughter*, an account of the early seventeenth century astronomer’s interactions with his daughter while she spent most of her short life in a nunnery, has written a basic, introductory book about the contents of the solar system with an approach that will appeal to more readers than just the non-scientist.

With her background as a seasoned science reporter, Sobel has obviously done her research for this work and must have talked to many planetary astronomers and other researchers in the solar system field. The book is as up-to-date as it can be at publication time with stories of current research, the latest results of the unmanned planetary spacecraft and it is filled with anecdotes about scientists, particularly historical ones.

The chapter on Mars, for instance, contains more than a few pages detailing the find of ALH84001, the meteorite from Mars discovered near the Allan Hills in Antarctica. This rock has become a celebrity in itself because of the widely distributed micrograph of its interior showing nanotubular structures resembling microscopic earthworms.

Sobel tells the tale of this find through the first person narrative of the meteorite (“Call me ‘It,’ or call me ‘Allan Hills 8001,’ my given name — even ‘Thing from Mars’ will suit.”) from the initial sound of the snowmobiles approaching it, to its appearance at the Johnson Space Center in Houston, Texas, to its description of its “home” on Mars. Very much to her credit, Sobel gives us the latest reasoning about the tiny cheese puff-appearing faux life forms: artifacts of the cleaning...
The Planets is intended for wide-ranging appeal and there it succeeds.

Galileo. This discussion almost appears to make an astrological parallel with the robotic planetary explorer of Jupiter (in the Jupiter chapter titled “Astrology”) that bears the astronomer’s name.

Indeed, later in the chapter she does present the astrological chart for the spacecraft, saying it reflects an aggressive, ambitious machine, all the while recounting the spacecraft’s orbital surveillance of the giant, Jovian gas planet and the subsequent in situ exploration of Jupiter’s atmosphere by a probe shot into its maelstrom.

Sobel goes on to say that the stunted deployment of the spacecraft's main communication antenna, which reduced the anticipated firehose-like stream of data bits broadcast from the craft to the earth to only a trickle, might have been anticipated by examining its chart. This reckoning comes from Mercury, the planet of communication, making a negative aspect with Jupiter’s position. Many science people will question why this discussion was included in a book that clearly explains good, basic science to a general audience; others will find its inclusion outrageous.

Another serious objection comes from the statement, “Had astronomy and astrology not parted ways so long ago, some of the Galileo mission’s problems might have been foreseen.” Clearly, had astronomy not branched off and eventually assimilated into a quantitative branch of physics rather than continue as a descriptive interpretation of observations, there might have been no technology for the scientists and engineers to develop the spacecraft or an understanding of planetary orbits to place the spacecraft in orbit around Jupiter.

The Planets is intended for wide-ranging appeal and there it succeeds. It is smooth reading, good for the layperson who is interested in an introduction to the solar system or as a supplement for a student taking a first course in astronomy. For the amateur astronomer with a good grounding in planetary astronomy and familiar with the sights of the solar system, the book serves as an enjoyable diversion, albeit with a few pseudo-science distractions. Planetarians will be able to glean many anecdotal stories for “live” planetarium shows that will hold the interest of the public. Those who are keen on Dava Sobel’s works and writing style will be pleased with her latest achievement.

Letter to the Editor

Dear Editor,

I was in Myanmar (formerly Burma) recently on vacation and stopped in at the planetarium in the People’s Park in Yangon (formerly Rangoon).

I had a very nice visit with the Director, Assistant Director, and Administrative Assistant, and got a tour of their facility. As little information was available in the IPS Directory, I gathered what I could and passed it on to Alan Gould for forwarding to Shawn Laatsch and inclusion in the next edition of the Directory.

At right is a picture I took of the planetarium staff in their theater in front of their Goto star projector.

Annual attendance is about 10,000 – mostly school groups.

In addition to the star projector, they also have a few special effects and slide projectors and a CRT video projector aimed at the dome that runs off of a 3/4 inch U-Matic video tape player and a DVD player. However, their real need is recent material (slides, CDs, DVDs) for this hardware.

Internet access in Myanmar is still very restricted, so simple downloads that many of us take for granted are still impossible for them. Therefore, if any members can send them spare, public domain materials or materials to which they own the rights, it would be very much appreciated. Send them to:

U Mg Mg Than Swe, Assistant Director
Yangon Planetarium
57 Ahlone Road
Dagon Township
Yangon
Myanmar
Tel: 011-95-01-382-887

Bill Gutsch
BillGutsch@cs.com

The staff left to right: Daw (Ms.) Aw Soe Thida, Director Daw (Ms.) Zin Mie Mie Ko, Administrative Assistant, and U (Mr.) Mg Mg Than Swe, Assistant Director. Photo courtesy Bill Gutsch.
**Fulldome 1.1**

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- Gnomonic
- Stereographic
- Orthographic
- Vertical perspective
- Cylindrical equidistant and equal area

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Astronomical algorithms (simulate the movement of the celestial sky for any given date and location)

All parameters are animatable

Stitching (images and video)

Hyperdome ready (display from 0° to 360° in your full dome workspace)
The cycle of time has wheeled round another lap, its chain has come off, and so it's about to be overtaken by its arch enemy, the deadline of destiny, which must mean it's time for me to hurry up and put together another Forum column...

The subject on which I invited your thoughts in the last issue of the Planetarian was:

Astronomy by its very nature covers a whole universe of topics, most of which we need to have varying depths of knowledge about in order to put shows together and answer questions from the public. But what are your favorite topics to talk or write about, and why?

Lordy, Lordy, I see Seth Jarvis riding into town with some thoughts on this topic, so let's tie up his horse, pass round the drinks, and hear him out.

+ + +

Many planetarians ply their trade in formal educational settings as part of an established curriculum. Those of us associated with public planetariums enjoy the luxury of practicing informal science education with audiences who have volunteered their attention without thought of a grade.

I believe that the setting of an informal astronomy lesson is as important as the subject matter. It's been my experience that there are two optimal venues for discussing astronomy, and neither of them involve blackboards, projectors or lecture hall seating.

The first is a living room, with everyone recently fed and comfortably seated. In this setting people slow down a bit and engage in genuine conversation on subjects not normally discussed in their regular and hectic daily routines. No PowerPoint slides or full-dome video are required to engage a half a dozen people in a conversation about the significance of finding yet another Kuiper Belt Object, why the Cassini spacecraft had to be nuclear powered, or why it's important that we carefully catalog Near Earth Objects.

It is pleasant to let the conversation wander a bit and allow the subject matter to bounce around like a thought caught in a pinball machine. “Near Earth Objects? You mean like that Bruce Willis movie? Do you think that could really happen?” If the topic then drifts to Shoemaker-Levy 9 or the Oort Cloud, who cares? People are talking about astronomy! Follow your audience’s lead, don’t lecture.

My second favorite venue is under a dark clear night sky with my telescope next to me and a small crowd of people (invitees and folks just passing by) spending as much time looking up as they do trying to see me in the dark.

I typically recruit someone from the crowd as my “telescope slave” and make them responsible for keeping my non-motorized telescope centered on the object being discussed. This helps de-mystify telescopes for the audience and gives the Telescope Slave a memorable experience. (I often have multiple slaves in an evening.) In this way I am free to speak directly with the people asking questions, point to things in the sky with my “Light Saber” (we all have preferences, lasers or flashlights) and keep an eye out for interesting things to call to the attention of the audience. “Look! Overhead and a little to the east, that’s a satellite! Sunset was an hour ago down here but a couple of hundred miles up in space, the Sun is still up. In a moment the satellite will pass into Earth’s shadow and it will disappear from view. That thing over there moving through the Big Dipper? No, that’s not a satellite, see the way it blinks? That’s the Boeing Nebula.”

All of my presentations are qualitative rather than quantitative. Yes, I know astronomy is math-intensive, but I also know that virtually no one in the general public cares about the mental gymnastics that astronomers must master to achieve their mind-boggling results. Non-astronomers trust that complicated math is involved, and they’re happy to leave it at that.

With all of the above as a preamble, what follows are my favorite topics to talk about with the general public. It’s all old-hat to most planetarians, but in my years of talking about astronomy with non-astronomers I’ve found that the following content areas really gets audiences excited:

- We live in a universe of maybe a couple of hundred billion galaxies. Each galaxy is comprised of anywhere from tens of millions to several hundred billion stars. Each star is an enormous ball of gas, converting mass into energy. Some do it faster than others. Like infamous Rock Stars, real stars that live hard also die young. Hard-living stars that burn the candle at both ends (and several places in the middle) die spectacular deaths and become exotic stellar corpses such as neutron stars or black holes. Most folks have no idea about the hierarchy of solar systems, stars and galaxies, nor the quantities and distances involved. They’re always impressed with the fact that stars have “lives” encompassing birth, maturity, and death.
- As a follow-up to the above, I like to talk to people about how the oxygen and nitrogen in the air that we breathe, the carbon in the food we eat, the iron in our blood, the calcium in our bones, the gold in the fillings in our teeth - all of the atoms that comprise our physical existence - were created during the deaths of stars. The atoms in each chemical reaction that occurs in our brains that make thought possible are the debris of dead stars. Carl Sagan put it best: “We are a way for the stars to know themselves.” The periodic table of the elements is an inventory of the wreckage produced by the violent deaths of stars. Carbon and oxygen are abundant because dying stars make substantial amounts of these atoms. Gold, platinum, uranium and the like are rare because stars make relatively little of the stuff when they “die.” This is all standard-issue fare in any discussion of stellar evolution, but I’ve found that audiences are deeply moved by the concept that the origins of atoms can be known, and that they are connected to the stars more intimately than any astrologer can ever imagine.
- There are now more than ten times as many planets known to exist outside our solar system as exist within our solar system, and the number of known extrasolar planets is growing by leaps and bounds. The only reason almost all of these newly discovered plants are Jupiter-sized monsters at Mercury-like distances from their primary stars is that, generally speaking, those are about the only planets our instruments are capable of detecting. When we have instruments capa-
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ble of looking for Earth-sized planets at Earth-like distances from their stars, will we find them? That’s a terrific question, and one well worth answering. This subject is responsible for more satisfying conversation over a coffee table than you can imagine.

- I like to call people’s attention to the fact that there are almost exactly the same number of inches in a mile as there are astronomical units in a light year. This serendipitous coincidence means that you can describe (with apologies to adherents to the metric system) the scale size of the solar system and the distances to the stars in the night sky in ways that your audience can easily grasp. See that bright object over there? That’s Saturn. Tonight it’s about nine times farther from the Earth than Earth is from the Sun, or nine “astronomical units.”

That other star over there is Betelgeuse. It’s about 500 light years distant and about a billion miles in diameter. Put another way, if you scrunched the universe such that a microscopic Saturn were nine inches from your nose, then at that scale Betelgeuse would still be over 500 miles away, and the size of a soccer ball. Equally remarkable, Betelgeuse is a super-duper super-giant star. Most stars, including our Sun, at this scale would be so small you’d need a strong magnifying glass to see. Our entire solar system would fit on the top of a card table. All these other stars we can see would be anywhere from a dozen to a thousand miles from us. What’s in between all that? Nothing to speak of. That’s why it’s called “space.”

- The constellations are accidents of time and place. We see patterns in the distributions of stars the same way we see pictures in clouds. Let a few millennia go by, or move a few dozen light years, and the pictures fall apart. There is more than altitude and azimuth going on up there. See the twin stars of Gemini – Castor and Pollux? They’re not twins at all. They are two dissimilar stars, each at distinctly different distances. Only their chance arrangement relative to our eyes causes them to appear as similar stars. When you board a star ship and boldly go where no man has gone before, the constellations distort as your relationship to the stars shifts. When you arrive at Vulcan or whatever your destination, entirely new arrangements of stars requires the invention of a new set of constellations. In addition to the under-appreciated concept of the stars being at varying distances from us, most audiences are impressed by the fact that over long spans of time the stars of the sky rearrange themselves due to their proper motion. Even if we remain Earth-bound, the constellations will slowly warp as the stars drift through space.

If you're successful, you'll leave your audience with furrowed brows and frowns. That means you’ve got them thinking about what they’ve heard. It’s a wonderful thing to see. I know all of us in this line of work live for it.

Seth Jarvis
Director, Sheila M. Clark Planetarium
110 South 400 West
Salt Lake City, Utah, 84101, USA

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The criteria by which I judge a topic include its storytelling appeal or its status among current events; the observational or “do something” opportunities related to the topic; the degree to which the star projector and planetarium equipment have an integral role, and the personal satisfaction I get from embracing the topic. Not surprisingly, for these reasons my favorite topic in recent years has been the transit of Venus.

For storytelling appeal — its story, not what I did with it — the transit of Venus was a gem. It featured global adventure, scientific discovery, resounding defeats, human triumphs, and new understanding of our place in the cosmos. The transit dovetailed seamlessly with multiple disciplines, yielding broad education opportunities. Anyone could showcase past transit of Venus events, from comical to grand, to promote science, math, art, and social studies.

Current events bring relevance for the viewer while providing a toehold for the planetarium to build on the visitor’s heightened awareness. New-found urgency of the topic invigorates me as well. The 2004 transit of Venus brought its own sound bite: “not seen by any human now alive.”

Encouragement of sky-gazing is imperative in any planetarium program, whether it be a simple solar system show or a cosmology mind-bender. Observational astronomy — by day or by night — requires people to stop, to look up, and to observe the firmament. It’s that simple, and it’s that important. Though emphasis on a single visual spectacle can dis-embowel a program if, say, clouds intervene, the transit of Venus featured 21st century safety nets – live webcasts from around the world. Also, students and observers could reproduce the quest of past explorers by contributing their local timings to a modern global effort.

Playwright Anton Chekhov said, “If a gun is on the mantle in the first act, it must go off in the third.” Similarly, if a planetarium showcases its grand projector, the equipment ought to be a central feature of the visitor’s experience. My favorite topics capitalize on the capabilities of the planetarium, and the transit of Venus sufficiently filled that need.

A digital planetarium, not at my disposal, could have done wonders to explain the periodic nature of the celestial alignment.

Though we had 120 years to prepare for the 2004 transit, this ideal topic somehow crept up on us. I felt like I and a small cadre of astronomy colleagues were nursing along a silent giant, encouraging others to embrace the patient. The lack of co-ordination is a strong argument for space agencies and the planetarium community to create a road map of prioritized topics, as proposed by a recent NASA Explorer Institutes focus group with the Great Lakes Planetarium Association.

I can discern my favorite topics by the energy I willingly commit to them. Outdoor lighting issues are becoming a new priority. However, seeing the transit of Venus under clear skies on June 8, 2004, and knowing its story, was a personal triumph. Therein was the sheer joy of astronomy.

Chuck Bueter
15893 Ashville Lane
Granger, Indiana, 46530, USA

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I love to try to make all the wonderful astronomy and space news meaningful for the public. It’s an embarrassment of riches these days, with all the incredible discoveries in astronomy, cosmology, and planetary science in the news. A minor headline may catch someone’s attention for a minute or two, but by the next day, it’s probably disappeared from their life like it never happened. I find that talking to the public about their future, and especially their children’s future, as being linked to space and astronomy, gives them an entirely new perspective. It also helps them to appreciate the importance of science at a time when the idea has become rubbery from the many attacks on it in some parts of the U.S. Deep Impact was important if we’re to understand the nature of comets, since they’ve impacted Earth in the past, and may do so in the future. We need to study the Sun - and other stars, for that matter; our planet’s primary source of energy needs to be deeply understood if we’re going to predict any future problems.

By studying Mars with missions like MER and Phoenix, we’re laying the groundwork for future manned missions that the 10-year olds of today will probably command. Attention is racked from the abstract to the practical as they realize how they’re living in an amazing world at an amazing time. They can see themselves participating in a space-faring future, venturing into new and unexplored territory. The idea is just as powerful and attractive as it was in the 1960s when
astronauts were celebrated as planetary heroes. I'm excited to give them real reasons to start cheering again.

Davin Flateau
Managing Producer
CyberDome Theater
Exploration Place
300 N. McLean Blvd.
Wichita, Kansas, 67203, USA

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I have a couple of favorite topics. I enjoy talking about 'shooting stars' and what really causes them. I tell my audience that 'shooting stars' are not stars at all, but burning rocks. (Yes, I know the rock is not burning, it wears away from ablation, but that's a hard concept for elementary school students). I tell my audience that the Earth strikes about 1000 objects a day and that generally, they don’t hit us, we hit them since the Earth orbits the Sun in excess of 106,000 kph. This can lead to the discussion of how you possibly be moving that fast and not know it (another of my favorite topics). I tell them that the average speed of a bullet is between 20 and 25 km per second, and when these rocks hit the upper atmosphere they’re traveling between 16 and 70 km per second.

My planetarium room is about 15 x 9 x 9 meters, an ideal size to talk about meteors since anything smaller than that approximate size burns up entirely on the way down. Car-sized rocks, school bus-sized rocks, small house-sized rocks, all disappear. Then I tell them that about twice a week, the remnants of a rock that was originally bigger than the planetarium room punches all the way through to Earth’s surface. And then I ask them where 70% of all the rocks that hit the Earth land.

I go on to tell them that a rock as large as a football field can leave a big dent when it lands, and I tell them about the rock roughly that size that augured into the Pacific in the early 1990s. Didn’t hear about that one? It was seen by the Star Wars defense system, didn’t hear about that one? It was seen by the Star Wars defense system, probably moved that fast and not know it (another of my favorite topics). I tell them that the average speed of a bullet is between 20 and 25 km per second, and when these rocks hit the upper atmosphere they’re traveling between 16 and 70 km per second.

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I generally enjoy writing about astronomy-related topics more than talking about them, but when it comes to educating and entertaining our planetarium audiences, the one subject I thoroughly enjoy both writing and talking about is the seasonal night sky.

Introducing our audiences to what’s up in the sky with helpful verbal and visual aids for locating stars and objects is an important ingredient in our show formula and has proven to be a reason why many of our planetarium visitors return. I write seasonal what’s up in the sky scripts to include not only current positions and information of planets and any upcoming celestial phenomena, but also make the night sky storytelling more relevant by adding local lore, legends, and even our latitude to make constellation identification and mythologies more intriguing, entertaining, and learning friendly. Including these elements give me far more flexibility and creativity in telling a story, and by using the region's historical interpretations of the sky the astronomy comes across more effectively. The seasonal night sky is really one of the surest ways to get audiences interested and involved with astronomy, and it’s an effective way for pointing out celestial objects within the constellations. This topic is also perhaps the easiest way to make a connection with your audience about how astronomy is accessible to everyone, how making personal celestial discoveries in your own backyard takes patience and some perseverance, but it's self-gratifying and an acquired knowledge you can share with your family.

Within the academic setting, my favorite time of the semester is when we discuss the topics of time and space and gravity, as well as the more bizarre theories of galactic evolution. This material captures the imagination of most students, the subject matter is current, it's thought provoking, and the questions asked lead to lively discussions. My presentations become more animated with this subject matter primarily because I see students become more challenged to imagine or visualize the concept before rationalizing the content.

To a lesser degree I enjoy a good discussion around debunking the general public's misconceptions in astronomy. The majority of those who take the time to listen and understand why their thinking might be fuzzy are usually grateful for a reasonable explanation or clarification, and they may even go away with more respect for the planetarium.

I only wish that the task of writing more detailed show scripts were as straightforward and enjoyable as these above-mentioned topics.

Jon W. Elvert
Director, Irene W. Pennington
Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana, USA

Pam Eastlick
Pution Tasi Planetarium
University of Guam
Mangilao, Guam, 96923, USA

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Jon W. Elvert
Director, Irene W. Pennington
Planetarium
Louisiana Art & Science Museum
100 South River Road
Baton Rouge, Louisiana, USA
Show topics at the Maryland Science Center’s Davis Planetarium are typically driven by current/anticipated events during the run of a show and/or occasional grant funded support and affiliations. If there isn’t a timely significant event that we can foresee, visitor surveys reveal topics of public interest. While I couldn’t pick a favorite topic to treat, I think the basics of the night sky are timeless and often seem to be the most appreciated. For automated “feature” productions, regardless of topic, I enjoy incorporating abstractions on the dome to complement just about any subject matter. I think the color, light and music of a show can inspire exploration and discovery as well as any informative explanation.

Wendy Ackerman
Davis Planetarium
601 Light Street
Baltimore, Maryland, 21230, USA

We should note and accept that our favorite topics may very well not be the public’s favorites, and that the public is fragmented, with different groups having somewhat different favorites. Thirteen year old boys are going to be wildly enthused by a show on supernovas or on asteroids wiping out dinosaurs, topics other audiences might accept but be a bit less excited by.

Of all the probably two hundred different shows I’ve done, my personal favorite was one I did at least 25 years ago, about Alfonso the Wise. I used music he wrote for it, and the unusual sound contributed a great deal to the quality of the show. But I realize not a whole lot of the public is dying to learn about how almanacs were made more accurate.

Various aspects of the space program are popular with our profession because they are easy to write, easy to get suitable graphics for, and have a sure-fire, whizz-bang effect. And the public usually is interested.

Solar system tours are for the terminally lazy or overworked planetarium director. I feel the same is true of constellation shows, plus this topic panders to superstition if not handled carefully.

The formation of the solar system and stellar evolution are both good topics of value, but nowadays we have religious fanatics running around threatening people’s jobs (at least) if they deviate from the weird precepts of someone’s favorite cult.

I have also done shows dramatizing science fiction stories, including Lucian’s Vera Historia and the Brick Moon, by the same author as The Man Without a Country. The advantage of these two stories is that neither one is covered by copyright, and they can be adapted any way you please. I have never tried to use a story by Gerritt Serviss, an astronomer active about a century ago, who wrote a fair amount of SF, but he even did a story about Thomas Edison attacking and conquering Mars!

Tastes differ, but as society sinks further into the depths of anti-intellectual fervor, planetariums are on the front lines of the battle, both in defense of the good, and taking abuse from the enemy. I’ve yet to hear of one of our colleagues losing a job for mentioning the Earth having an age measured in billions of years, but it’s coming if we aren’t ready.

This is a tough question: I have enough trouble picking a favorite color! Perhaps the best way to answer this would be to recap the process the way it bounced around in my head. My first thought was that teaching about the current sky was my favorite. And then I thought about the solar system, the Apollo program and the Moon, the structure of the universe, nocturnal animals, and they all seemed like they could be my favorite! I figured that it wasn’t fair to say everything, so it was back to the drawing board (or maybe back to the psychologist’s couch).

Upon further examination, I realized that the solar system was my favorite as I was sharing new photos and findings from Cassini and the rovers; and the Apollo program was my favorite when I was preparing and updating a show about the Moon; the structure of the universe was my favorite while I was developing a program about our place in the universe; the subject of nocturnal animals was my favorite when I was recounting my latest owl encounter to a bunch of kindergartners; and the current sky seems to be my favorite any time I’m sharing it with others under both the perforated and celestial domes.

I noticed two themes here: number one, whatever I’m teaching about now seems to be my favorite (or maybe I just have a bad memory); number two, whatever I’m learning about seems to be my favorite. This vacillating mental condition definitely has its advantages: I’m always excited about what I’m teaching or learning. I have a dog-like propensity to get excited about every new audience, every new toy, and every learning challenge. Perhaps I’ve also stumbled backward into a fundamental aspect of our human nature, and a fantastic pedagogical technique. We love to solve challenging problems and learn new concepts, and we’re excited to share what we’ve learned. The learning challenge comes when I find something I don’t know, which happens often. And the learning comes from searching for answers. The learning itself is satisfying, but it’s also fun to create some way to share that knowledge or experience with others.

What topics in astronomy do I find most interesting to talk and write about?

Do current events or special topics capture the attention of our visitors? This question was on my mind in early January while flying home to Chicago after a week observing with the VERITAS gamma ray telescope prototypes at Mt. Hopkins south of Tucson, Arizona. Looking down over the barren, Mars-like landscape of the south-western United States reminded me of the bevy of craft currently orbiting the red planet, and the two rovers still slowly crawling across its surface. Even popular Mars remained of supreme interest in the public eye for just a few days or weeks immediately before and after Beagle crashed or Spirit and Opportunity landed, and perhaps only for a few hours after some special ESA or NASA/JPL Mars news bulletins. However, people talked about Mars for more than a month near opposition (partly due to the hype generated by those maddening emails proclaiming that Mars would appear as big as the Moon... again!) Cassini’s amazing photos of Saturn and its menagerie of moons turned the heads of most planetarium visitors only briefly. Deep Impact took center stage just as the probe reached ground zero. Although current event topics remain only briefly in the public consciousness, I believe it is our responsibility as planetarians to alert them to these events, show them the incredible new photographs, and provide them an opportunity to explore these subjects deeper.

Here at Adler, we scheduled 15-minute science updates, taught adult evening classes, and wrote articles about the Mars probes,
Cassini’s encounter with the Saturn system, and Deep Impact, but only produced public shows on Mars and Saturn. During Mars opposition this year, we worked jointly with local amateur organizations to provide three special observing sessions to view Mars through telescopes.

On New Year’s Eve the few of us who gathered in the ridge dorm at Mt. Hopkins discussed how we might explain the complex physics related to our VERITAS gamma ray observing project. What are the most effective ways to explain such complicated subjects to public and school audiences? Should we even try explaining difficult concepts?

Besides the perennially popular shows that attempt to cover the entire Universe from birth to death, it’s clear to me that our audiences immensely enjoy the end stages of stars, and super-massive black holes. But, the physics and mathematics necessary to understand these bizarre objects leave most of them cold. By combining science and art in our shows and lectures using scientific visualization we can overcome many barriers. Additionally, by evaluating the way our audiences react (positively or negatively) to our shows or lectures, we can revise our explanations to help them increase their knowledge and enjoy their visit. We’ll be using both of these techniques on our latest show project – explaining the science objectives of the Interstellar Boundary Explorer (IBEX).

Larry Ciupik
Astronomer, Adler Planetarium & Astronomy Museum
1300 S. Lake Shore Drive
Chicago, Illinois, 60605, USA

My favorite topic is backyard astronomy; it’s important to help visitors make the connection between the simulation of the planetarium sky and the real thing. My goal is to have the audience leave a program and say to themselves, “That was a great show about Saturn (etc.); now I know where to look for it tonight.”

My highest priority is to any timely sky events, such as eclipses and comet apparitions, and so on. So my speaking style is conversational and of a practical, “Here’s how to find it,” nature. I like to bring in mythology and the stories concerning stars and constellations, too. Again, I want visitors to see star patterns in the planetarium that are also visible in the current evening sky. I’ve found that a lot of folks like to hear the old stories from other lands; these tales connect us to people of long ago and far away, and help us to understand them and their lives a little better. It’s always a joy to bring out the life histories of astronomers, too, as they were very much like us, torn between the allure of the heavens and the practicalities of everyday existence. I also talk up the space program and current attempts to understand the Universe, but I tend to gloss over some of the detailed information, with the hope that if I can get someone interested in a topic, they’ll go ahead and get a book about it if they really wants all those details. I might do a show about spacecraft, but no one’s ever going to leave my theater and say, “Great, now I know just how to build one of those things!”

Jon U. Bell
Associate Professor of Astronomy
Hallstrom Planetarium Director
Indian River Community College
3209 Virginia Ave., Fort Pierce, Florida 34981, USA

In my university years, some time before I became a planetarian, I was trained as a radio astronomer. Quite frankly, I don’t get to discuss the merits of aperture synthesis under the dome very often! The fact is, over the years, I learned a lot more astronomy working at a planetarium than in my previous university schooling. I truly became a generalist, and I think I can provide a generally accurate answer to most questions that a typical planetarium audience can throw at me. And if I don’t, I’m not afraid to say “I don’t know, but I’ll find out.” For several years around Christmas time, we used to present a special Ask An Astronomer lecture to members of our local astronomy club. We didn’t know the questions in advance, and had to improvise our way to the answer. These were lots of fun! With time, the questions became more and more challenging, but my colleagues and I were always up to the task. I think that almost twenty years of planetarium work has made me a better astronomer; at least, I can point to major constellations of the northern hemisphere, a feat a lot of my faculty members colleagues can’t!:

Notwithstanding the above, I do have some pet topics, my very favourite being the quest for life in the universe. I read a lot about the subject and wrote and lectured extensively about it in the past five years. I’m also co-producing a planetarium show on this very topic (produced by Alan Dyer, from Calgary) with my fellow Canadian planetarians. I sincerely think that ET life is the next big thing in astronomy - and I’m not talking about UFOs, crop circles and flying saucers! No, I’m talking about extremophiles here on Earth, fossilized (or living?) microbes on Mars, a living ocean under Europa’s icy crust, even oxygen, methane and water vapour in the atmosphere of an Earth-like exoplanet soon to be discovered. I’m also talking about the (remote) possibility that we hear from ET over the radio, so to speak.. We live in exciting times where, after Copernicus chased us from the centre of the cosmos, Darwin reminded us of our animal ancestry, and Hubble expanded our universe beyond imagination, we may discover very soon that we are not alone in this vast expanse of space. Discovering that the laws of biology and evolution are as universal as the laws of physics or chemistry would be the ultimate lesson in humility for the human race. On a more philosophical note, history shows that people very often come together while confronted by “others” (other person, other tribe, other nation, etc.) that help define who they are. Discovering “others” that are really alien to humankind might just be the kind of “confrontation” we need to really unite people on this planet. A universal wake-up call, if you will. In these times of political crisis and environmental threat to our own survival, isn’t it something that we all badly need?

F. Pierre Chastenay
Astronomer, Planétarium de Montréal
1000 rue Saint-Jacques Ouest
Montreal, Quebec, H3C 1G7 Canada

I love giving planetarium shows because I love astronomy and I love meeting and talking with people. With so many topics in astronomy, there are lots of opportunities for shows and questions from the public. I have a graduate degree in astronomy and I’ve written an astronomy column for a children’s magazine (Odyssey) for many years. One of my favorite topics is simply helping the public understand what they see in the sky in a welcoming setting.

Nowadays, you can hardly see stars around the bright lights of a big city, so you end up with a population of people that never look at the sky because they don’t see anything interesting to look at, a population of people who occasionally see a bright object and wonder what it is, a population who knows there are constellations but can’t figure out where they are (!) and people who are physically not able to see stars at all because of visual impairment or blindness. I like to think that I can reach people in all of these groups, even if it is on different levels. In fact, once a person takes a seat in the planetarium, I know I have a chance to make a connection.

A familiar city pan and some bright stars is a great place to begin. If you point out what
a person can see from the city, you have given that person something they can use and share with others. If you take the audience away from the city to a dark location, a starry sky becomes unveiled. "Wow..." is the reaction I hear all the time. And it is here that I can point out the majesty of the night sky with sky objects, star patterns and share stories from long ago. For those who are not able to see the stars with their eyes, I provide tactile star charts that they can explore with their fingertips and mind's eye.

Life seems really busy these days. With all the hustle and bustle of people running in all directions to work, school, and activities, sharing 40 minutes of quiet time under a starry sky is therapeutic – and it allows a person to sit back and really take in an incredible view.

There are so many amazing topics in astronomy, but my favorite will always be a personal tour of the night sky, as shared by a friend.

Noreen Grice
Charles Hayden Planetarium
Museum of Science
Science Park
Boston, Massachusetts, 02114, USA

The other day I was thinking back to my first ever visit to a planetarium. It occurred when I was nine (that would be about ten years ago, right? Yeah, I wish!) when I attended a schools show at the London Planetarium. Looking back I'm amazed that I ended up working in these domes, as I was terrified back then to see the silhouette of the old Zeiss against the orange-lit dome before the show began. To my young, overactive imagination it looked like a huge, hulking space alien ... So this memory inspired me to come up with the subject for the next Forum column:

What are your earliest memories of attending a planetarium show for the first time? Did it inspire you to read about astronomy? Or was it just another day out with the school or family? Can you make a connection between those early experiences inside our domes with your decision later in life to become a planetarian?

Please send me your contributions by the deadline of April 9, written on the exterior of a 15-foot wide observatory dome containing a Celestron C12 computer-driven telescope, with diffraction-limited optics, CCD, GoTo feature, Polaris mount, and a Plossl eyepiece. Alternatively, just email me your piece if that's cheaper...

Before I close out the column, I'd like to publicly thank our esteemed Editor, John Mosley, for his incredible hard work and dedication spread over 77 issues of our fine journal. He's instituted many improvements in its appearance and content, and put it on a professional par with the magazines we see on show in the shops every day. Planetarian wouldn't look out of place next to them. That says it all. And on a personal note, he's kept me on track on more than one occasion, so I wish John the best in his well deserved retirement.

OK, that's it for now. I'm off to meet with Stephen Hawking and discuss with him Homer Simpson's theory that the universe is doughnut-shaped ...
present the full dome video show:

origins of

The amazing story of how life on Earth began, seeking out the great questions of our existence.

Narrated by: Lord Robert Winston
Anita M. Sohus  
NASA/Jet Propulsion Laboratory, California Institute of Technology  
4800 Oak Grove Drive  
Pasadena, California 91109  
USA  
(1) 818-354-6613  
(1) 818-354-7586 fax  
anita.m.sohus@jpl.nasa.gov

January brought two beautiful sights for solar system explorers: an intact Stardust sample return capsule laying safely on the sands of the Utah desert, and a Pluto-bound spacecraft streaking into the Florida sky.

When New Horizons speeds past Pluto and Charon in July 2015, today’s kindergartners will be in high school. Perhaps some of them will remember watching the launch with you in your planetariums, and perhaps some of them will be student hosts for that year’s crop of youngsters. Although the flight to Pluto will be long, the road to the Pluto mission itself has been longer. I remember the 1998 meeting of the American Astronomical Society’s Division for Planetary Sciences (DPS) in Pasadena, California. As part of a long-standing DPS tradition, NASA’s then-Associate Administrator for Space Science addressed the planetary science community on NASA Night, and gave little hope for a mission to Pluto. When the time came for questions from the audience, a long line of planetary scientists queued up for the microphone. Alan Stern of Southwest Research Institute made an impassioned case for Pluto. The NASA brass said no. Rich Terrile of JPL made an impassioned case. The NASA brass said no. The next speaker, and the next, and the next, took the mic and spoke out for Pluto. Within the year, NASA announced a competitive opportunity for proposals to go to Pluto and possibly continue on to explore Kuiper Belt Objects. Alan’s proposal won out over Rich’s, and now some of us may get a closer look at Pluto in our lifetimes. Follow the mission’s progress at http://pluto.jhuapl.edu.

On January 15, 2006, the Stardust spacecraft dropped off its precious cargo of interstellar and cometary dust particles from Comet Wild 2. The canister landed safely in the Utah desert and was ferried to the curatorship at NASA’s Johnson Space Center near Houston, Texas. Early reports describe thousands of particle trails in the aerogel from the dust impacts, and mission scientists are ecstatic, particular Don Brownlee, the principal investigator from the University of Washington, and Peter Tsou, the deputy principal investigator from JPL. Peter actually developed the type of aerogel used for Stardust. At the time it was the purest aerogel ever made. Aerogel has been around since the 1930s, but is still relatively expensive to make for commercial purposes. Its insulative properties are remarkable; a half-inch slab of aerogel has the same insulating capability as R-44 insulation for housing. Aerogel has been used to protect the warm electronics boxes for the Mars Sojourner rover and both Mars Exploration Rovers.

The Stardust mother ship is now in solar orbit, and NASA has invited proposals for an extended mission to use its camera and other instruments to study another body. An extended mission for the Deep Impact mother ship is also invited. These proposals are underway and due at NASA HQ by April 6, so a decision is not likely before summer.

Comet expert Don Yeomans of JPL fielded questions from Solar System Ambassadors and Museum Alliance partners a few days after Stardust’s return. I thought you’d like to “listen in” on that conversation:

When asked what sort of comet mission he’d like to see next, Don said, “Well, I’d be very interested in getting a rendezvous mission, where we actually sit there for months and study the comet and bring a sample back. When I say a sample, I mean an icy-surface sample. Stardust, of course, is bringing back dust particles over the nonvolatile portion of the comet, and that’s extremely interesting. But what we’d really like is a volatile - the ice as well as the dust from the surface. [It would take] a Lander and perhaps a coring device and then a sample return. Now that mission is well outside the current Discovery class cost cap. So that would have to be done under a different program.”

Another question for Don concerned whether or not there is any evidence at all in the Deep Impact analysis of amino acids or any strictly-speaking biological molecules found within the nucleus of that comet. Don replied: “The problem is the spectroanalysis of the gases from the comet, Tempel 1. Most of the carbon-based materials and elements or molecules are all grouped in one region of the spectrum. So there’s so much crowding in that region - it’s around two microns - that it is very difficult to separate out just which individual species are there. So they really can’t say whether there are any amino acids
Comet expert Don Yeomans of JPL fielded questions from Solar System Ambassadors and Museum Alliance partners a few days after Stardust’s return. I thought you’d like to “listen in” on that conversation:

to participate in analyzing these samples as well. So as sort of a reward for all the work they put into the mission, the PI and his co-Is are given this six-month grace period where-by they don’t really have competition; but after the six-month grace period, they do.

Question: “Has Wild 2 been in the inner solar system for a shorter period of time than Tempel 1? Or do we know that?”

Don: “To be honest, we really don’t know that. I traced the orbit of Wild 2 backwards in time for quite a while. And of course, as everyone knows, it made a close Jupiter approach in 1974, which took it from a perihelion near Jupiter to a perihelion where it is now. So a lot of folks have been claiming that Wild 2 has only been in the inner solar system for five orbits, but that’s not to say that a couple of thousand years ago it was also in the inner solar system. In truth, we really don’t know that Wild 2 is a younger or less evolved object than Tempel 1.”

Question: “What can we say about the difference in the composition of Tempel 1 and Wild 2 now? The thing with Wild 2 is we have all these precipices that seem to imply a more rigid structure than what we saw at Tempel 1. Do we know anything about whether Wild 2 had more ice than Tempel 1?”

Don: “That’s a good question. I don’t think the measurements are going to tell us definitively. On Tempel 1, I think the dust-to-ice ratio is three to one at least. And on Wild 2, you mentioned the 100-meter cliffs. Now that measurement has been used to show that object is extremely weak because there’s very little gravity on that comet, of course. So if you were to take that 100-meter cliff and bring it back to Earth, it would collapse. With the strength of the material you had at Wild 2, you could only build a cliff of about a millimeter on the Earth’s surface. So this stuff is weaker than a very weak soufflé, or even sort of like a cappuccino foam. It’s extremely weak material.”

Question: “Is there concern with planning a future landing mission after what we learned from Deep Impact about the make-up of the surface, possibly sinking into this powdery/fluffy stuff?”

Don: “As you pointed out, the results from Deep Impact suggest that the surface of that comet, Tempel 1, at least, has tens of meters of very fine talcum powder-like dust and is extremely weak. It’s very fragile material, very weak material, held together by very little.

“So that raises the issue of when Rosetta gets to its comet, Churyumov-Gerasimenko, is it going to be able to land and anchor without sinking into the surface? I would guess it could land, certainly, because this is very deep talcum powder-like stuff, but the gravity on that comet is next to nothing. So landing I don’t think would be a problem, but anchoring in order to drill would be a problem, I would guess. So hopefully that will work. The Rosetta folks seem to think they’ve got those bases covered, but it’ll be an interesting period to see whether that landing goes as planned or not.”

Question: “So Don, to follow up on that, you’re talking about the gravity being really weak there. So have there actually been calculations done? I would suppose people are looking at the composition of this material and the gravity to see if a certain body would tend to sink in or actually be able to set down on the surface without sinking in?”

Don: “Yes. Those calculations have been done for a variety of different surface materials - from powdery surfaces like we found on the surface of Tempel 1 all the way up to cement, which was the high end and doesn’t seem to be relevant at all. But again, the Rosetta folks considered all of those surfaces and don’t seem particularly concerned about burying themselves in the dust. I think they’re going to be okay.

“The same issues were raised back in the early Apollo days, of course, when Tommy Gold suggested that the moon was covered with so much dust that the astronauts would sink in. But that didn’t happen, and the moon has a heck of a lot more gravity than these comets. So there is a lot of dust. It is a very weak environment, but that’s the bad news. The good news is there’s almost no gravity, so you don’t sink in very far.”

Ambassador: “Is it required to have liquid water for clays and carbonates, or will water ice allow them to form as well?”

Don: “I think it does require liquid water. Presumably, that raises the question of where does that liquid water come from? So it must have been in the interior where the pressure was great enough to allow at least a short period of time when it was liquid. You can even imagine a comet nucleus now that would have a solid, impermeable crust, and then the pressure would build up underneath that crust, so you could have liquid water briefly. So it’s not impossible to do, but it’s going to require a little change in thinking.

“I think you do need liquid water, and that would suggest that either the liquid...
formed as a result of this impenetrable crust that allowed pressure to build up, or it was part of a much larger object where you had similar pressures that would allow liquid water to exist. Because in the areas where comets are most likely to be found, you just don’t have liquid water, of course. It’s just too cold.”

Question: “Do we know anything about the surface temperature of Wild 2? Tempel 1 was approximately room temperature, based on the measurement.”

Don: “Well these comets have very low thermal inertias. That is, they heat up quickly and they cool off very quickly. So you can have one temperature on one side and a vastly different temperature on the other. But the material and the albedo of Wild 2 and Tempel 1 were very similar. So if they were both at the same distance from the Sun, my guess would be they would have similar surface temperatures on the day and night sides. I mean, both of them have very low thermal inertias.

“It’s like going to the beach. If you walk around on the sand in the Sunlight, it can get very hot. But as soon as the Sun goes behind a cloud, the sand cools off very quickly because of this rubble-like sand. On the other hand, if you’re sitting on a rock at the beach, it’s also hot during the Sunlight, but it doesn’t cool off very quickly when the Sun goes behind a cloud. So that’s a high-thermal inertia on that rock and a very low thermal inertia on the sand.

“Comets, again, have a very low thermal inertia because of this grainy material. The particles are even smaller than sand, but they are individual particles of dust, and subsurface, there’s also some ice grains. Except on Tempel 1, 5% of the surface actually has solid ice on the surface. But the remainder of the comet, or 40% of the comet was subsurface, and probably in the form of icy grains rather than slabs of ice.”

Question: “Do you expect a very large difference in composition between these comets, the Jupiter class, and classes that orbit much farther away?”

Don: “The Jupiter class comets, or the short-period comets, like Tempel 1 and Wild 2, are thought to have originated near the Kuiper Belt, which is out beyond the orbit of Pluto, and then planetary perturbations or gravity tugs brought them in to the inner solar system. Whereas comets that work their way out to the Oort Cloud and then come back as long-period comets, like Hyukatake and Hale-Bopp, actually formed closer to the Sun than did the short-period comets. They formed in the region of Uranus and Neptune and those two giant gas bodies, and to a lesser extent Jupiter, threw some of those comets out into the Oort Cloud where passing stars or the perturbations of the galaxy itself – the galactic plane – brought them back.

“So you have this strange situation where new comets, like Hyukatake and Hale-Bopp, that are coming in from the Oort Cloud, actually formed closer to the Sun than did the short-period comets that formed in the Kuiper Belt and are coming back. So you expect some differences in their makeup because one group was formed closer to the Sun than the other, but there are subtle differences. And of course, the short-period comets, in general, have been around the Sun so many more times that they’ve lost much of their carbon monoxide/carbon dioxide ices, the volatile ices that are far more volatile than water ice. So as a rule, you’re left with mostly water-ice and dust; whereas, the new comets show far more carbon monoxide/carbon dioxide and some of the more exotic and more volatile species.

“So the ideal mission, of course, would be to go to a new comet, like Hale-Bopp, and sample that one, because they would be less changed and more primitive than the short-period comets. But that’s so difficult that that’s not in the cards right now.”

Question: “That’s always been my question, when NASA describes these as pristine bodies. Every time they come close to the Sun, they’re actually…”

Don: “That’s very true. It’s correct to say that they are among the least changed objects in the solar system, but that doesn’t mean that they are not changed at all. The short-period comets indeed have been changed/modified as a result of passing by the Sun so many times. A comet like Hale-Bopp would be far more pristine, but that one would be so tough to grab in rendezvous that it just isn’t in the cards yet.”
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2-3-10 Nishihonmachii, Nishi-ku
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President’s Message

Martin George, Curator
Launceston Planetarium
Queen Victoria Museum
Wellington Street
Launceston, Tasmania
Australia
+61 (3) 63233777
+61 (3) 63233776 fax
martin@qvmag.tas.gov.au

With 2006 now well upon us it gives me great pleasure, first of all, to ‘welcome back’ John Mosley immediately! John has agreed in his retirement, on a contract basis, to continue for now as Editor of the Planetarian. While the Officers and the Publications Committee continue to work on the long-term future of the editorship, it’s wonderful to still have John with us after his many years of service.

This magazine is our flagship publication and over the years has had many wonderful articles. I am sure that, like me, you have made a good deal of use of them, as we share our knowledge and expertise through this great medium.

I’d like to take this opportunity to remind you all of the importance of submitting articles to our journal. If you’ve been wanting to write – as examples, about your own special project in the planetarium, a piece of equipment you’ve designed, or a piece of historical research you have done, just to name a few possibilities - how about putting finger to keyboard?

I have already written to affiliate representatives around the world to mention this point, and I hope that at some of the regional meetings this year, this subject will come up for discussion. There may, for example, be possibilities for jointly-written articles by people within an affiliate.

On a different note, I am delighted with the number of entries for the scriptwriting competition. Steve Tidey received nine entries this year, and they are being judged as this issue is being produced. Thank you to Steve and all who entered, and I am very pleased that the competition is going from strength to strength!

Scriptwriting is a key element of our work as planetarians, and I must apologise for not mentioning in my December President’s Message that, included with that mailing of the journal, among other things, was the new IPS Scriptwriting CD. Entitled Tips for Excellent Script Writing, the CD contains an MS Word and a .pdf version of the publication. It is an updated and expanded version of the original publication by the Great Lakes Planetarium Association. Thanks to GLPA, Steve Tidey, and all those who contributed to it! It makes excellent reading; I found that once I started on it, I couldn’t put it down! There are plenty of quotes and advice from well-known fellow planetarians and it’s jam-packed with tips and comments with which we can all identify – including the important acknowledgment that, in order to write the best scripts, we all need quiet time away from any other duties!

In October, I was delighted to attend the two Planetarium Innovation Days at Carl Zeiss in Jena, Germany. A number of fine new technologies were showcased, and the viewing of these, and the related discussions and social interactions, made for a wonderful two days. Naturally, I don’t wish to be seen to be actively promoting one product over another – indeed, there is much wonderful technology and many great planetarium-related products being produced by a number of different organisations around the world! However, what we all saw was most impressive. For example, I had been waiting eagerly to see the new Zeiss ZKP4 in action and it did not fail to impress, especially in combination with the new Spacegate system. The new Sony 16-megapixel projector – the SRX-R110 – was a highlight, too, with two of these able to provide extremely sharp all-dome coverage. It’s great to see another partnership working well here, too, with Sony’s project being used with a Carl Zeiss lens. There was also some fine content of the historical research you have done, just to name a few possibilities - how about putting finger to keyboard?

Social activities were also a highlight, allowing colleagues from around the world to share ideas over drinks and dinners. On the night of October 9, the group attended a memorable dinner at the Planetarium in Jena, with the floor of the planetarium being turned into a restaurant with a wonderful atmosphere. During the meal, we were treated to, amongst other things, a fine laser show in the dome.

Of particular interest was a session held toward the end of the first day. It was a panel discussion entitled Future Requirements for the Planetarium Industry. I was honoured to be invited to participate as a panelist, along with Shawn Laatsch (IPS Treasurer and Membership Chairman) and Ian McLennan (of Ian

A key element, in my opinion, is the live night sky show that connects the audience with the presenter. A knowledgable presentation, especially with the implication that the presenter, also, is looking forward to seeing the sky on that night, does something that a movie cannot.
McLennan Consulting in Vancouver, B.C.]. The three of us spoke of our ideas on the topic, and there was much discussion that arose as a result of comments and questions from many of our colleagues.

What fascinated me in particular was that with very little, if any, prior discussion as to our individual views, Ian, Shawn and I came up with very similar comments. The overriding theme from the three of us is that in order to assess what is needed of the planetarium industry, we need to look firstly at the endpoint of what we are trying to achieve. We need to imagine that we are the people going in to see our own shows, and to think about the way we want our audiences to think and feel as they walk into and out of the planetarium. Are we trying, for example, to promote or justify the money spent on astronomy? Are we trying to reach into the minds of the audience members? Are we aiming to tell them what is in the sky tonight? Of course, we are trying to do all of those things, and more. So we need to start by thinking about why we have planetariums in the first place.

I particularly liked Shawn's comment that “The technology should not be driving us; we should be using the technologies we have, to shape the audience experience”. Shawn also addressed the commonly-used aims of education and entertainment, and added a very important and powerful point that clearly means a great deal to everyone. “We are here mostly to inspire.” These words reach into our own minds – at least, certainly in my case. I can’t think of a single word that better describes what we are trying to achieve. Thinking about this point, we as planetarians are often faced with the fact, especially as a result of our relatively limited budgets, we can’t compete with the blockbuster movies. We tell ourselves - quite correctly - that, in any case, that is not our aim. As with the movies, I do like to think of us as providing our audiences with value for money, but I like to think of our aim as going farther than a movie. Does a cinema thriller about the Earth being hit by a comet or asteroid inspire most of the audience to learn more about these objects? Perhaps it does in some cases, but I would imagine that these are few and far between. As planetarians, we can achieve this inspiration far more effectively, and a major reason for that is that we have the human interaction that a movie does not, and cannot, offer.

I have said this before, and I have no reservations about saying it again: the staff members of a planetarium are its greatest asset. A key element, in my opinion, is the live night sky show that connects the audience with the presenter. A knowledgeable presentation, especially with the implication that the presenter, also, is looking forward to seeing the sky on that night, does something that a movie cannot. This invites questions from the audience, either while they are still seated under the dome, or as they leave the planetarium. It’s something quite separate from the technology: the presenter making himself available to members of the audience, to answer questions about the show and the sights of the current night sky.

This is not to say that our aims don’t go hand-in-hand with the wonderful technology that is available to us. Ian McLennan said that “…the audience is hungry for the experience. They may have a basic understanding of the wonders of the Universe […]. With the visual technologies that we have, and the multimedia technologies that are coming, I think we can take them to another place that they couldn’t possibly have imagined.”

Very true. And very inspirational.

As I write this President’s Message, I am continuing to forge closer ties with our colleagues in China. Following on from the IPS Council meeting in September, I have kept in regular contact with the staff of the Beijing Planetarium – in particular, the Director, Dr. Jin Zhu, and Ms. Guo Xia, Assistant Manager of the Information Centre. Ms. Guo has been very helpful in expanding our knowledge of Chinese planetariums. I shall shortly be visiting China once again to assist them with forming an affiliate group and visiting planetariums in several places around the country. By the time you
read this, my trip will have been completed, and I shall look forward to reporting on my visit in my next President's Message. I am still working on the possibility of the formation of an affiliate group from South America - Brazil in particular, and also hope to have more to report on that topic in the next issue.

IPS 2006 in Melbourne (July 24-27) is approaching rapidly and I'd like to remind you all that the deadline for early registration is April 21. All information about the conference can be found at the website www.ips2006.com and you should all have received a hard copy of the conference brochure, which was mailed out in November. In early January, it became apparent to me that there had been a delay in mailings within the USA, for which I apologise; from what I have gathered, IPS members in other countries seem to have received theirs on time in December. I am looking forward to seeing as many of you as possible in Melbourne - we're in for a great time!

As I mentioned in the December Planetarian, the Adler Planetarium in Chicago will be hosting the 2008 IPS conference. I’d like to remind everyone that bids for IPS 2010 are most welcome, and need to be submitted in time for the 2006 IPS Council Meeting, which will be held in Melbourne, Australia (at the 2006 conference), over the weekend of July 22-23. I shall be pleased to discuss possible bids with potential hosts and look forward to receiving some strong bids for 2010.

As a reminder, the rules for submitting conference bids are available on our IPS website (www.ips-planetarium.org). They can be accessed quickly by clicking on ‘bylaws’ in the ‘organisation’ section of the main IPS page, and clicking on the link to ‘standing rules.

Turning to regional conferences, there are several coming up in the next few months and I'd like to wish you all the best for these events. I do apologise to affiliate groups whose conferences I can't attend - I would love to be able to get to all of them personally - but to this end I have prepared a ten-minute DVD to be played with a message from me. These were sent out in early January, and all Affiliates should by now have received their copy. The DVD should play in all regions of the world, but do let me know if you have any problems!

As you read this, I shall be leading a tour group on a trip to see the total solar eclipse. We start with a trip through France to see a number of its historical observatories and finish with several days in Turkey. We shall be viewing the eclipse on March 29 from the Turkish coast near Antalya. I am sure that there will be several other planetarians going to this event, whether they are leading tours, travelling with friends and families, or simply going it alone. Whatever your choice of location, I wish you safe travels and a fine view of the spectacle. I'm sure that there will be plenty of pictures being shown at IPS 2006!☆

Minutes of the IPS Council Meeting
The Beijing Planetarium
Beijing, China
September 24-25, 2005
* indicates action items

In attendance:
President Martin George
President-Elect Susan Button
Past President Jon Elvert
Treasurer Shawn Laatsch
Secretary Lee Ann Hennig
Affiliate Representatives:
Association of Dutch Speaking Planetariums (ADSP) – Milo Grootjen for Chris Janssen
Association of French Speaking Planetariums (APLF) - Susan Button for Agnès Acker
Association of Mexican Planetariums (AMPAC) - Gerardo Trujillo Jimenez for Ignacio Castro Pinal
Australasian Planetarium Society (APS) – Martin Bush
British Association of Planetaria (BAP) – Dr. Tom Mason
Council of German Planetariums (RDP) - Thomas Kraupe for Eduard Thomas
European/Mediterranean Planetarium Association (EMPA) - Jon Elvert for Dionysios Simopoulos
Great Lakes Planetarium Association (GLPA) - Chuck Bueter
Great Plains Planetarium Association (GPPA) - John Hare for Jack Dunn
Italian Planetaria’s Friends Association (IPFA) - Shawn Laatsch for Loris Ramponi
Japan Planetarium Society (JPS) – Martin George for Shoichi Itoh
Middle Atlantic Planetarium Society (MAPS) - Lee Ann Hennig for Patty Seaton
Nordic Planetarium Association (NPA) - Lars Broman
Pacific Planetarium Association (PPA) – Dale Smith for Gail Chaid
Planetarium Society of India (PSI) - Prof. Gopinath Subramanian
Rocky Mountain Planetarium Association (RMPA) - Chuck Bueter for Kevin Scott
Southeastern Planetarium Association (SEPA) - John Hare
Southwestern Association of Planetariums (SWAP) - Carolyn Sumners for Tony Butterfield

Affiliates not in attendance:
The meeting was called to order at 9:00 A.M. by President Martin George. Martin welcomed Council to Beijing and introduced our host, Dr. Jin Zhu, Director of the Beijing Planetarium and the Ancient Observatory. Martin expressed Council’s gratitude for the work that Dr. Zhu and his associates did in hosting Council for this meeting. Dr. Zhu presented his staff and gave an introduction to some of the sites around the city that Council would have an opportunity to visit during the meeting. During the introductions of Council members and guests, Martin welcomed new additions to Council and reviewed the format for the Council meeting as well as changes in the agenda.

The **Secretary’s Report** on the Minutes of the 2004 Valencia, Spain Meeting had been previously published in the December 2004 *Planetarian*. Three corrections to the Minutes were made, regarding spelling errors, and then Shawn Laatsch moved to accept the Minutes, seconded by Lars Broman, and approved by Council.

Shawn Laatsch presented the **Treasurer’s Report**. Shawn reviewed the report and format of the audit of the IPS Treasury conducted by Richard R. Cox Certified Public Accountant. This audit stated “the financial position of the International Planetarium Society, Inc. as of December 31, 2004, and the changes in its net assets and cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.” Based on the size of our organization, the accounting firm suggested that IPS consider having a review audit every year instead of a full audit, thus saving about $1500 (USD). *Chuck Bueter moved to have a review prepared for the next Council Meeting, seconded by Susan Button and approved by Council.*

Council reviewed and discussed specifics of the 2004 Financial Report, the mid-year 2005 Budget, and the proposed 05/06 Budget. The Treasurer reported that for the first time the finances for the *Planetarian* advertising are current. This is due in large part to the efforts of Chuck Bueter for his exceptional work in recruiting advertisers and setting up the advance-billing program. It was reported in the final financial report from the Valencia conference that a tax on conference profits would be applied. Shawn requested that this issue be included in the Conference Guidelines and for potential conference hosts to notify IPS if this is a factor in their bids.

Treasurer/Membership Committee Chair Shawn Laatsch presented the **Membership Report**.

Total Membership as of September 2005 is 682 (287 International Members and 395 United States Members). Lars Broman asked about possible reasons for the decrease in the U.S. membership and increase in International membership. Possible reasons for the decrease could be late renewals, non-U.S. conference in 2004 and others. Jon Elvert suggested that it would be interesting to look at the demographics of the membership fluctuations to see if there is a correlation to economics, conference location, obligation to regionals. Shawn noted that this year he received many more personal checks/payments for dues as opposed to corporate/institutional payments. Perhaps an indication that money is limited to personal commitment.

Martin Bush moved to approve the Treasurer/Membership Reports, seconded by Tom Mason and approved by Council.

Past President Jon Elvert presented the **Past President’s Report** as a summary of the goals, challenges and opportunities that were part of his tenure as President:

- The *Planetarian* is now a full color publication
- Significant restructuring and redesign of committees in consultation with Committee Chairs and Council has been accomplished
- The President’s Message in the *Planetarian* has been instrumental in showcasing reports from various committee Chairs to encourage and enlighten the membership on committee work
- Jon worked diligently at enhancing the image of IPS with professional societies/organizations and seeking opportunities for cooperation with those entities (NASA, JPL, STScI)
- Among the highlights were: organizing the off-year Council Meeting in Jena and representing IPS at regional and international conferences
- Jon offered thanks to the Officers, Council Representatives, Committee Chairs and *Planetarian* Editor John Mosley

Shawn Laatsch moved to accept Past President Jon Elvert’s report, seconded by Susan Button and approved by Council.

President Martin George delivered the **President’s Report**. This report will be published in the *Planetarian*. Martin concentrated on the following topics:

- The selection of Beijing for the 2005 Council Meeting site: large number of planetaria - many of which are not IPS members - and China’s rich history of astronomy
- The importance of attending conferences in promotion of IPS (regional as well as international) and reaching out to those areas which may not have regionals or may not be aware of IPS
- Formalize the Memorandum of Understanding (MOU) with NASA and then expand that model to other organizations
- Develop guidelines for a Media Officer for IPS
- Future Directions of IPS: analyze the Strategic Planning Report recommendations with appropriate action
- Jon Elvert will write a report on the status of planetarium facilities in the U.S. Gulf Coast area affected by the 2005 Hurricanes
- Highlight the Star Partners’ Program and visit some of the facilities that have benefited from the fund.

**Affiliate Reports**

Written Affiliate Reports were reviewed. In Affiliate News from the floor:

ADSP Representative Milo Grootjen reported that they would be hosting several events in 2006 with an international flavor, one of which is the International Planetarium Day, in May of 2006.

SEPA Representative John Hare reported on the Triple Conjunction Conference: GLPA/MAPS/SEPA to be held October 9-13, 2007 at the Oglebay Conference Center/Planetarium in Wheeling, West Virginia (host Steve Mitch). John also spoke to the issue of several planetariums in the SEPA area that were affected by the recent hurricanes.

President Elect Susan Button remarked that AMPAC’s weblinks to other electronic versions of journals within Mexico was a good idea, as well as their utilization of WebTV transmissions for those unable to attend conferences in person. IPFA’s promotion of the Eugenides Foundation Scriptwriting Competition presents an interesting format: there will be a national competition from which one script will be selected and then translated into English. This will enable the
author to submit the script into the Eugenides Foundation Scriptwriting contest. The winner of the Italian Planetaria’s Friend Association competition will also receive a one-year membership in IPS compliments of IPFA. This event could be used to demonstrate to other non-English speaking countries a way to promote diffusion of the Eugenides contest.

GLPA Representative Chuck Bueter announced that Dr. Dale Smith was the recipient of GLPA’s Galileo Award, in recognition of planetarians who have made contributions, particularly to the international planetarium community. Chuck also mentioned the collaboration between NASA and GLPA in providing funding opportunities based on the outcomes of a NASA Explorer Initiative (NEI) Focus Group.

NPA Representative and International News Editor for the Planetarian Lars Broman thanked those affiliates who relayed regional news to him and reminded everyone to please be diligent in passing newsworthy items on to him for inclusion in the column. Council expressed its gratitude to IPFA Representative Loris Ramponi for his efforts in collecting material from the regions for the Affiliate Calendar.

AMPAC Representative Gerardo Trujillo commented on the outstanding success of incorporating web-TV access in their conferences this year and encouraged others to use this valuable tool in future conferences.

Portable Planetarium Committee Chair Susan Button reminded Council Members to include some information relating to portable planetaria in their Affiliate Reports: number of portable facilities in the region, and activities/work carried on by the portable planetaria. These items will be included in the next Affiliate Report cycle.

Susan Button moved to accept all Affiliate Reports, seconded by Lars Broman and approved by Council.

Conferences
IPS 2004 Valencia Conference Report
President Martin George reported that Jose Carlos was invited to Council to give the final report on the Valencia Conference but was unable to attend. Treasurer Shawn Laatsch reviewed his material relating to the 2004 Conference and updated the latest figures from Valencia in the Treasurer’s Report. Council discussed how lessons learned from the Valencia Conference could be applied to future conferences:

a. emphasize the importance of the December deadline (in the year of the conference) for the final financial report
b. encourage future conference bidders to be prepared to reimburse members in a timely manner for any prepaid expenses that subsequently require reimbursement
c. address the issue of full-dome presentations and how to manage the issue of time and facility utilization
d. balance the accommodation factor for small dome/education facilities and large/full-dome facilities: how we can best meet the needs of both sectors.

Council expressed its sincere gratitude to our Valencia colleagues for the hard work, gracious hosting, beautiful setting and wonderful hospitality extended to the planetarium community during the conference.

IPS 2006 Melbourne Conference
Host and Australasian Planetarium Society Representative Martin Bush reported on the plans for the July 24-27, Australian event. Conference organizers expect the registration fee to be approximately $430 (USD). Keynote Speakers will include David Malin, Fred Watson, and John Storey. Pre- and Post-Conference Tours will include visits to observatories and planetariums of Australia (information will be posted on the website) and suggested itineraries for extensions will be updated on the Conference Website.

Council discussed the issue of dates for IPS Conferences. It was agreed that we should continue to monitor the membership’s preferences in terms of the best time for scheduling conferences while also taking into account the conference host’s requirements for holding a conference. Surveying the membership periodically regarding this issue will continue.

2008 IPS Conference Bids were presented by the following representatives:
- Genoveo Figueroa Silva and Gerardo Trujillo Jimenez, Centro de Conven¬ciones de Morelia, Lic. Felipe Rivera Planetarium, Morelia, Mexico
- Alex Barnett (via Video), Chabot Planetarium, Oakland, California USA
- Paul Knappenberger, Adler Planetarium, Chicago, Illinois USA

Each of the representatives (who were present) from the potential host facilities answered questions and addressed aspects of their respective bids. Following the presentations, Council held considerable discussion regarding the bids. Discussion carried over until Sunday and then Council voted on the host for the IPS 2008 Conference. The Adler Planetarium in Chicago, Illinois will be the host institution for the IPS 2008 Conference from June 15-20. Council expressed its appreciation for the time, work, and tremendous efforts that the 2008 Conference Bids obviously invested, and encouraged Morelia and Chabot to consider the possibility of hosting future conferences.

Standing Committee Reports
Standing Committee Reports were presented, reviewed and discussed (this section continued over to the Sunday meeting).

President Martin George presented the IPS Elections Committee report on behalf of Chair Steve Mitch. Council Members were urged to encourage their members to vote in the elections. 2004 marked the first time that IPS used the electronic format for posting and retrieval of the ballots. This resulted in a significant financial savings (about 50%) over the previous method of postal mail. A call for the next slate of nominations will be made in March 2006.

Council discussed the IPS Fellows nominees presented in Chair Jon Bell’s IPS Awards Committee Report. At the Council meeting in Valencia, two candidates for the IPS Service Award were approved.
- Thomas Kraupe moved to accept the IPS Fellow nominations, seconded by Carolyn Summers and approved by Council. The IPS Fellows and Service Award honorees will be presented in 2006 at the IPS Melbourne.

The IPS Publications Committee Chair Dale Smith reported on the activities of the Committee. The September 2005 edition of Planetarian will be the 73th consecutive quarterly issue, under the leadership of John Mosley (now in his 19th year as Editor). John will be retiring as Executive Editor at the end of 2005 and a search is in progress for John’s successor. Council echoed Chair Dale Smith’s gratitude to Editor John, his talented team of Associate Editors and contributors, and Advertising Coordinator Chuck Bueter. Dale reminded Affiliates to encourage their membership to use our journal as a means of sharing their creative work with the planetarium community. The IPS Directory contains two distinct sections, the IPS Directory of the World’s Planetariums (“white pages”) and the IPS Resource Directory (“yellow pages”), and is edited by Chair Dale Smith. The 2005 Directory will go to press as a CD in September 2005 and will be distributed free to all IPS members. It will also be posted in the members-only area of the IPS website. The Directory is published on a biennial basis with updated files available on the website between editions.

Special Publications:
- IPS Astronomical Songbook (Jon Bell, Editor) includes texts for dozens of astronomical songs and recordings of many of them. The CD-ROM will be distributed with a future issue of the Planetarian.
- The Moon Phase Book (Jay Ryan, artist/author) original artwork has been digi-
totally scanned and the presentation format is being arranged. Release date for the CD-ROM will be early 2006.

- **Small/Portable Planetarium Guidebook** in Spanish: Dr. Pedro Saizar of Buenos Aires, Argentina (astronomer/educator/author) and Susan Button, co-author, produced this first IPS publication in a language other than English. The CD was distributed to all known planetariums in Spanish- and Portuguese-speaking countries and is available on request to any IPS members.

- A Scriptwriting book (Steve Tidey, editor) based on an earlier GLPA booklet, this updated and internationalized version is slated for release in CD form in late 2005 or early 2006 as a joint IPS/GLPA publication.

**Status of other documents, publications, and efforts**

- The Proceedings of the IPS 2004 Valenciana Conference were distributed as a CD in June 2005. Thanks to Dr. José Carlos Guirado for his capable editing of this volume.

- Past issues of the *Planetarian* are being scanned into electronic format thanks to Agnès Acker and Laurence Demond for their dedicated work on this effort.

- Chair Dale Smith has created a comprehensive list of all past IPS publications (besides the *Planetarian*) including 16 Directories, 10 Conference Proceedings, 15 Special Reports, and 5 administrations of President’s Newsletters.

- Dale is in the process of scanning the past publications into electronic form as PDF files, except for those originally released on CD, and all will be archived on CD format.

- Dale reported that IPS keeps three repositories of back publications: the U.S. Repository is with Treasurer/Membership Chair Shawn Laatsch; the European Repository is with Chris Janssen at Europlanetarium in Genk, Belgium; and the Asian Repository is with Shoichi Itoh at the Suginami Science Center in Tokyo, Japan.

- IPS continues the program of exchanging abstracts between the *Planetarian* and two affiliate publications the APLF French journal *Planetariums* and the IPS Japanese journal *Twilight*.

- The Publications Committee continues to coordinate the inserts included in the *Planetarian*.

**Ad Hoc Committee Reports**

- The *IPS Education Committee Report* was submitted by Chair April Whitt. President Martin George reported that April would be stepping down as Chair at the end of this year. A review of the mission of the committee will take place when the new Chair is announced.

- The **IPS Full-Dome Video Committee Report** was submitted by Chair Ed Lantz. The committee has been busy with the following projects and accomplishments:
  - published proceedings of the Fulldome Standards Summit held at the IPS 2004 Valencia conference
  - instituted a Fulldome Compendium Online
  - added a fulldome resources page to the IPS website
  - instituted a regular column in the *Planetarian* called Digital Frontiers
  - planned a series of meetings to discuss the status of the digital planetarium profession

Chair Ed Lantz outlined future goals of the committee including the following: researching standardization procedures for various aspects of fulldome issues, organizing a second Fulldome Summit at IPS 2006 in Melbourne, continuing to promote dialog and publications regarding digital planetarium technologies, and working with other IPS committees to further support and guide the digital transition. Council discussed the mission and objectives of the new committee. President Martin George will address some of the procedural issues and proposed goals of the committee with the Chair.

The **IPS History Committee Report** was delivered by Historian John Hare. He reported that several items have been added to the IPS Archives, most notably some originals and copies of letters to Grace Spitz and others, as well as information and publications regarding early Spitz projectors and educational publications. These materials were furnished by Jordan Marché. John hopes to move forward on the long-term projects regarding the archives.

- The President informed Council that the **IPS Outreach Committee** Chair Christine Shupla had stepped down due to family and career issues. Martin is working on Christine’s replacement and hopes to announce a new Chair soon.

- The **IPS Language Committee Report** was presented by Chair Martin George. Martin reported that despite his busy schedule as President, the committee continued to work on completing the series of translations for the IPS Membership Brochure and exploring the challenge of translations at conferences. The Language and Publications Committees are working very closely on projects related to multilingual issues.

**The IPS Planetarium Development Group** chaired by Ken Wilson is making progress on the **IPS Planetarium Development Guide**, however the project is not complete. “So You Want to Build a Planetarium” has been converted to PDF format and has been posted on the IPS Website. Ken wrote the chapter on interior domes and it is now undergoing peer review. The chapter on laser projection systems by Jack Dunn is complete and should be posted on the IPS website before the end of this year. Kris McCall is working on the chapter related to automation and control systems. The chapter on safety and security is awaiting completion of peer review. Ken still needs authors for the chapters on renovation, special effects/multi-image and participatory planetaria.

Chair Susan Button presented the **IPS Portable Planetarium Committee Report**. Susan reiterated her desire to have a contact for portable planetariums in each regional affiliate. This item will be included on the Affiliate Report Template as well. Three mini-conferences for portables were held in the U.S. this year. Gilles Roussel, in Nantes, organized the 2005 APLF Conference with a double perspective: the usual APLF meeting (in French), and the Third European Meeting of Portable Planetariums (in English). An issue that the committee would like to address involves defining the use of video all-sky as an effective tool in portable domes. Council discussed the issue of the difficulty of tracking and identifying new portables. Dale Smith suggested that IPS provide vendors of portables with membership brochures to pass on to the portable facilities and that would enable the new facilities to contact IPS.

Steve Tidey, Chair of the **IPS Script Contest Committee**, submitted a report on the Eugenides Foundation Scriptwriting Contest. As a result of improvements in the implementation and goals of the contest that were approved in Valencia, Steve reported on his progress for the upcoming contest. Announcement of the latest competition with the new rules and prize money, was launched in the March 2005 *Planetarian*. In addition, Steve provided flyers publicizing the competition to be included in several regional conference registration packets. The contest will also be publicized on Dome-L, IPSNews and of course the IPS website.

Chair Alan Gould submitted the report of the **IPS Web Committee**. Council agreed that the website has taken on a more professional look and function as well as being more member-friendly. The accomplishments for this year fall into three major categories: maintaining the IPS Website, introduction of new functions, and designing site up-
grades. The maintenance of the site includes updates, additions, refinements, and alterations of page designs. The introduction of new functions involves adding new pages for committee-related topics, integrating pages into the main IPS home page. The committee will continue to work on improvements and upgrades on the website. Council expressed its appreciation for the work that Alan and the committee have devoted in making the website an important aspect of IPS membership. IPS Media Distribution Committee Report was presented by Chair Thomas Kraupe. In light of the changing trend and demand for media/slides and several overlapping goals with the IPS Outreach Committee, Thomas suggested that perhaps there should be a merging of the two committees. President Martin George commented that, indeed, this was an idea the officers had been considering in terms of better defining the missions of the two committees. A consolidation of the committees would allow for refined objectives and coordination of efforts in meeting the goals of both committees. It was agreed that on-line materials are easier to access and place on a format preferred by the user and so the decline in requests for the Slide Service (availability of first generation slides from various sources) will need to be addressed soon. Council discussed various definitions of “outreach” - what does it mean to our membership? Does it mean: 1. reaching out to our membership (outreach within) by distributing resources within the membership 2. connecting with other organizations (JPL, NASA, etc) for educational materials that are outside of IPS (the planetarium community’s leverage is the community we serve) 3. marketing: is it something that IPS representatives should be doing within their own regions 4. reaching out to the community (school/public) 5. creating materials/strategy that can be shared within the membership and thereby empowering IPS members to effectively reach out to the community 6. collecting, creating, and distributing materials/resources and/or teaching strategies for educators and planetarians The officers and the new Outreach Committee Chair will re-evaluate the missions of the Outreach, Media Distribution, and Education committees and report back to Council with suggestions for restructuring.

Constitution Issues
Secretary Lee Ann Hennig reported that the approved changes to the By-Laws and Standing Rules have been incorporated into the latest version of the document. President Elect Susan Button, former President and Publications Chair Dale Smith, and Lee Ann will review the document’s overall structure for ease of reading and will propose further revisions in specific sections requiring updated terminology, and clerical modifications as well. The draft changes will be submitted to Council for comment and subsequent approval.

Old Business
President Martin George reported that former President Martin Ratcliffe will be providing the officers with information and material he gathered in researching a corporate membership proposal and the conference guidelines revisions. The officers will present a proposal to Council regarding both these issues before the Melbourne Conference.

President Martin George has continued a project initiated by Past President Jon Elvert, the IPS Update Video for use by affiliates at regional conferences. It will be distributed to regional representatives before the end of the year.

NPA Representative Lars Broman reported on the status of the Armand Spitz Planetarium Education Fund grant approved for two of the master students in science communication at Dalarna University. They are Shibly Ahmed from Bangladesh and Xiao Xu from China. The reports from their thesis fieldwork and Internship at South Tyneside College Planetarium and Orion Planetarium will, once they are graded, be available at www.sciencecommunication.se. At the same address you can find the theses of 2004’s holders of the ASPEF scholarship, Hamid Asgari and Kayvan Seyed Nejadian (shared) and Claudette Martin. In keeping with the provisions of the grant, the students are submitting a report describing their experiences and the significance of their project to be published in the Planetarian and posted on the IPS Website. Lars reported that these scholarships, each worth US $500, have been very gratefully received by the students, and helped inspire them to choose a planetarium for the place of their thesis fieldwork. * Lars requested a renewal of the grant for 2006 and it was approved by Council.

President Martin George reported that work on a Memorandum of Understanding formalizing the flow of information between IPS and NASA is almost complete. He will be working with the officers and Anita Sohus to finalize the draft and then present it to Council. This document could serve as a model for future MOUs proposed through the Outreach Committee.

Council discussed some issues relating to Committee Reports such as failure to submit annual reports, reports that are submitted too late for inclusion in discussion, and lack of communication with committee chairs in response to Council requests. Suggestions to address these issues included:
1. arrange to have conference calls/video conference with Committee Chairs 2. monitor committees for habitual non-performance of responsibilities 3. periodic evaluation/review of committee missions, structure, and leadership

President Martin George continued the discussion regarding Committees in terms of restructuring and evaluating committees. Perhaps one solution is to have “one-person” committees, or a point person who is responsible for a particular task that does not require an entire committee. Consider the differentiation between committee assignments as opposed to a task assignment.

President Martin George reminded Council about the importance of participating in the IPS Council Electronic Group site. Martin will check with Web Committee Chair Alan Gould to see about a Council Section on the IPS Website similar to the E-Group site, as well as one for Committees.

New Business
President Martin George presented a proposed position statement addressing some of the issues related to the controversial topic of intelligent design/creationism vs. evolution. This is a critical point of debate in the educational community of the United States and is also becoming more common in other areas of the world. Former IPS President and Publications Chair Dale Smith was requested to draft a statement regarding the IPS position on this issue and to address the specifics of the Age of the Universe as a point of reference in the debate. Discussion and review of the draft by Council resulted in a motion by Shaun Laatsch to accept the position statement, seconded by Martin Bush and approved by Council. The document will be posted on the IPS Website and printed in the Planetarian.

Treasurer Shawn Laatsch brought up the topic of membership dues discounts for IPS members who are also members of an IPS Affiliate. Council discussed the issues related to providing such a service: the logistics of various dates for dues payable for each affiliate, accounting procedures, dues structures. President Martin George requested the Treasurer to draft a proposal for Joint IPS/ Affiliate membership to be presented to Council for review.
President Martin George elaborated on his plans to develop guidelines for a Media Officer for IPS. Upon receipt of the draft proposal Council will provide comments and review.

Council discussed a proposed shift in NASA’s efforts at outreach to focus on higher education at the expense of K-12 programs. Several astronomy and education associations have voiced their opposition regarding this dramatic shift in emphasis. Council directed President Martin George to write a letter to NASA Administrator explaining our concerns relating to this development and its possible consequences to the outreach program that planetariums have with the community and education in general.

President Martin George opened discussion on a proposal from IPFA Representative Loris Ramponi. A “Day of Planetaria” has been observed in different countries yearly since 1995. The next “Day of Planetaria” will be held on March 19, 2006. This special day was initiated and supported by the Italian Planetaria’s Friends Association. They feel that it is an important opportunity for involving the international community in a collaboration that aims to promote knowledge of planetaria to the public. The Italian Planetaria’s Friends Association would like IPS to consider supporting the “Day of Planetaria” (http://www.planetariaitaliani.it) as an IPS promoted day. Council discussed the issue of regional special days devoted to Astronomy- the fact that there are several celebrations in many regions makes it difficult to identify just one for the entire globe.

President Elect Susan Button stated that the idea was to have IPS give its support to the regional in its efforts to promote astronomy and planetariums. Council agreed that an effort should be made to allow the IPS logo and the phrase “IPS supports...” the efforts of regional events such as “Day of Planetaria”. It was also suggested that IPS share this information with other Affiliates so they are aware of what is going on in other regions.

**Tabled Items from Saturday’s Meeting**

President Martin George initiated discussion (continued from on-line Council discussion during the year) regarding the Strategic Planning Report. Martin read a letter from the consultants Ian McLennan and Robert Ballantyne effectively closing the books on the consultants’ work and informing Council that they would not be invoicing IPS for the bulk of the work undertaken on the Strategic Planning Initiative. They expressed their thanks to the IPS members who participated in the analysis.

The first item related to: **Change the governance structure of IPS: Council is gradually replaced by a small Board (7 or 9 members) elected directly by, and accountable to the membership. A broader Advisory Council made up of regionals and international representatives could provide overview/institutional continuity.**

The overwhelming response from Council Representatives based on discussions with affiliate membership was that the existing structure of Council was acceptable. Comments included:
1. Regionals need to actively involve the portable planetariums
2. Invite regional observers to Council meetings (non-voting) to see how the organization operates
3. Hold receptions at conferences for non-affiliated members: provide an introduction to affiliate structure of IPS and seek their opinions/comments
4. Look at ways to involve/represent non-affiliated planetarians
5. Geographical/cultural areas should address the issue of regional affiliation

* Susan Button moved that IPS Council Structure remain as is for the time being, seconded by Carolyn Sumners and approved by Council.

The second item related to: **Offer a new membership structure - sliding scale: individual membership rate-based on size of institution and ability to pay; affiliate membership for vendors and other professionals-with full participation opportunities; effect the proposed transition over time (2-4 years) to minimize any negative impacts.**

Considerable discussion took place regarding the issue of how to make IPS membership affordable for everyone.
1. Sliding scales for regular membership involves financial constraints and logistics concerns for the treasury.
2. Sliding scales should be fair, equitable, and reasonably implemented.
3. Sliding scales for corporate or institutional memberships might be easier to create.
4. Establish student membership structure and or sponsorships for eligible planetariums

* Lars Broman moved that that IPS Finance Committee investigate membership fees and explore options to make membership more accessible to the international community and to present those options to Council for consideration prior to the 2006 IPS Council meeting, seconded by Susan Button and approved by Council.

The third item also referred to the governance issue, but particularly with respect to the U.S. and its 7 regionals (the rest of world has 15), this was suggested as being lopsided. Discussion centered on whether there is a ‘fairer’ way of organizing representation. Council discussed suggestions relating to having a “weighted” vote based on the number of IPS members in each regional. There was an overwhelming sentiment from the U.S. affiliates that the system at present is equitable and prevents a domination effect that would result if individual members were considered instead of individual affiliate representation.

* Shawn Laatsch moved that the representation structure of IPS remain as is, seconded by Lars Broman and approved by Council.

The fourth item related to a suggestion to run IPS Conferences every year, with the alternate year’s conference being held in North America. Council comments included concerns that it would be difficult to choose conference sites by region; it is driven by bids; U.S. affiliates have strong regional conferences and don’t feel that there is a need to force conferences to occur on a regular basis in the States; it is important for the growth of IPS to be flexible in meeting in a variety of geographical areas.

* John Hare moved that the present structure of IPS conferences remain as is, seconded by Carolyn Sumners and approved by Council.

The fifth item addressed the proposal to hire a paid Secretariat (at approximately $50,000 per year).

Discussion by Council included the opinion that a paid Secretariat, in order to justify the salary, would have to do much more than the duties outlined in the Strategic Planning Report. The dues structure and financial situation of IPS would have to be changed dramatically to provide for a paid position. Raising fees for dues would have a negative effect on the small/medium planetarium facilities. Suggestions for defining a paid position involved the following:
1. Define the duties/responsibilities of such a paid position
2. Explore the issue of analyzing the work load of the officers and the editor
3. Determine the proper compensation for such a position and options for funding

* Susan Button moved that the Strategic Planning Committee be reinstated and directed to define the job of a Secretariat and to provide options for funding that position, seconded by Tom Mason and approved by Council.

With business completed, Shawn Laatsch moved to adjourn the Council Meeting, seconded by Jon Elvert and approved by Council.

Respectfully Submitted,

Lee Ann A. Hennig
IPS Secretary
September 25, 2005
Your Advertisement Could Go Here
(or on a page all it’s own)

Rate Sheet

Please read the advertising rates and advertising guidelines for the Planetarian and the IPS Directory:

http://www.ips-planetarium.org/planetarian/ratesheet4.htm

Guidelines for Contributors and Advertisers

Please read the Guidelines if you contemplate submitting an article or advertisement for publication:

http://www.ips-planetarium.org/planetarian/guidelines.html

contact Advertising Coordinator Chuck Bueter at bueter@rad-inc.com
leaves resolution and contrast as the primary differentiators between optical and digital. Let’s first take a closer look at resolution.

**Resolution**

The human eye has an average resolution or acuity of one arcminute, corresponding to the height of 20/20 letters on an eyechart. Many of us are born with better resolution than 20/20, and the eye's acuity actually is a function of image brightness, but the one arcminute standard has survived the years as the baseline human eye acuity. In a digital system it takes two pixels to represent a one-arcminute feature (two digital samples are required to represent one cycle or one optical "line pair" - the Nyquist sampling limit). Therefore a digital system would need to project 2 pixels per arcminute, 120 pixels per degree, or 21,600 pixels over 180 degrees in order to match the resolution of the average eye when viewed from dome center. In full-dome lingo, this would require a 21,600 x 21,600 pixel dome master (the 2-dimensional fisheye image that maps onto the dome screen). This is a total frame size of 466 million pixels, with 366 million active pixels (these are pixels within the fisheye circle that actually map to the dome screen). In Photoshop this would equate to a file size of 1.4 GB per frame, requiring over 50 TB for a single 20-minute program at 30 frames per second. In contrast, the highest resolution digital dome systems currently max out at 4,000 x 4,000 pixels per frame, or 22 pixels per degree - a far cry from eye-limited resolution.

I’d like to take a closer look at why [optomechanical systems in general still produce a superior starry night sky simulation than a digital system]; why this is still important to many, and venture a guess regarding when digital systems might evolve to match optical star projectors in starfield quality.

**Optical vs. Digital Stars**

There are several primary variables that determine image quality in a projected starfield, including the projected image brightness, resolution, and contrast, and the dome reflectivity itself. Assuming an audience with dark-adapted eyes, a believable starfield can be produced with minimal image brightness - a feat that is easily accomplished with optical and digital technologies. So image brightness is not a strong differentiator between optical and digital. A high dome reflectivity can also cause poor starfield contrast due to scattered light that effectively washes out the black regions of the sky. The effect of cross-dome scattering is also independent of the projection technology, however, and is not a strong differentiating factor. This

With all the excitement about digital systems, it must be said that the chapter on optomechanical star projectors is not yet closed. Many planetarians know that optomechanical systems in general still produce a superior starry night sky simulation. I’d like to take a closer look at why this is still important to many, and venture a guess regarding when digital systems might evolve to match optical star projectors in starfield quality.

**Digital Resolution**

How long will it be before affordable digital projectors can achieve eye-limited resolution? Unfortunately, digital projectors do not follow the famed “Moore’s Law” enjoyed by computer CPUs. For many years, the highest digital projector resolution available was SVGA (800x600) – CRT projectors outshined their digital competitors in contrast and resolution. Over the last decade, digital resolutions have slowly crept through SXGA (1280x1024) reaching QXGA (2048 x 1536). Currently the highest practical resolution from a commercially available digital projector (using the Sony SXRD device) is 4096 x 2160 pixels, or a total of 8.8 million pixels. It would take over 42 such projectors to cover a hemisphere with eye-limited resolution. Since the projector has four parallel inputs, it would require 168 graphics processors to drive such a display. E&S’s new Digistar 3 Laser projector hopes to improve on this with a 4000 x 4000 pixel resolution from a single fisheye lens. Over 23 of these systems would be required to achieve a 366 million pixel frame. The E&S laser projector can reportedly be configured for 8,000 x 8,000 pixel operation. Should this be practical (considering that 64 graphics processors are required to drive it), it would be a giant leap forward in resolution, perhaps rivaling the bright-star diameters of some of the high-end optical instruments.

While fundamental advancements are possible, it could be another decade or more before digital projectors can affordably achieve eye-limited resolution on a large-scale hemispheric screen. By then, it could be emissive displays - perhaps organic LED panels - that finally close the gap. In all fairness, it should be noted that a minority of planetariums have high-end optomechanical projectors. The vast majority of theaters operate with star diameters far below eye-limited resolution, many of which are already within reach of digital systems. It

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**Ed Lantz**

Visual Bandwidth, Inc.
1290 Baltimore Pike, Suite 111
Chadds Ford, Pennsylvania 19317 USA
ed@visualbandwidth.com
also must be said that resolution is not everything. E&S's Digistar I was so popular despite resolution limitations because of the advanced 3D database capabilities enabling proper motion of stars, 3D asterisms, etc.

**Contrast Ratio**

This brings us to the second differentiating factor between optical and digital - image contrast. There are two measures of contrast that are of interest here - “instantaneous” or ANSI contrast ratio and “sequential” or “on/off” contrast ratio. To measure ANSI contrast in a digital projector a 4x4 full white/full black checkerboard pattern is projected over the frame. ANSI contrast is the ratio between the averaged full white brightness and the full black brightness. This is a measure of the light scattered internally by the projector, resulting in some light from the white squares “bleeding” into the black squares. Note that if this measurement is performed in a dome, the cross-dome scattering will dominate and the projector contrast cannot be directly measured.

Sequential contrast is the brightness ratio between a full-white frame (on) and a full-black frame (off). This is a better measure of the projector’s ability to truly “fade to black.” Simply put, a poor sequential contrast ratio results in a poor starfield because the image can only fade to gray, not to full black. This gray background can wash out the Milky Way and ruin the aesthetics of the starry night, including the velvety black regions that make the night sky seem so dimensional, so awe inspiring. For most images other than stars, the black level of the projector is dominated by cross-dose scatter and is not much of a hindrance. If, for instance, the projected image includes a bright sun, the light from the sun “washes out” the entire dome, effectively masking the projector black (gray) level. But it is stars that most planetarians cherish. Many institutions are dubbed “star theaters” because of their mission to replicate the night sky, in many cases for city dwellers that rarely see a truly dark sky. So it is not a surprise that planetarians often scrutinize starfield quality more than any other feature of a new instrument.

So how black must black be to create an accurate starfield? By design, optomechanical instruments have extremely high instantaneous contrast (due to simple optics) and nearly infinite sequential contrast (since no light whatsoever is emitted when the lamp is extinguished). One experiment performed on a Spitz Model 1024 projector and a CRT projector in a 12-meter dome was quite revealing. The CRT black level was artificially raised to simulate poor contrast. At 1000:1 sequential contrast the 1024 starfield was clearly visible, but the deep blacks were washed out and the Milky Way was somewhat obscured. At 100,000:1 the “gray” frame from the projector no longer was visible when the stars were projected, but the dark-adapted eye could still easily spot the frame when the stars were turned off. The final test was to adjust the black level until it could no longer be detected by dark-adapted eyes. The resulting measured contrast was over 4 million to one! Beyond the need to create an accurate night sky, there is truly something special about placing an audience in a completely dark space, and having celestial objects emerge from the blackness of this simulated space. A pitch-black theater, in my experience, helps visitors to detach from “reality,” fostering a deep sense of presence - a primary goal of storytelling. Modern digital projectors with only 1000:1 sequential contrast leak enough light that one can clearly see around the room - true black is impossible without closing a shutter or shutting the projector off. As many planetarians know, however, achieving “darkroom” black levels are difficult in any case - even a single LED emitter can ruin the effect, and some municipalities will not allow exit signs to be dimmed during shows. My conclusion is that, in most cases, a 50,000:1 sequential contrast ratio is sufficient to create an awe-inspiring night sky that competes favorably with optical instruments.

**How long will it be before digital projector contrast can compete with optical instruments for low-end and mid-market systems? This could happen quite soon, actually. One contender is the SEOS-patented RGBK four-panel projection engine architecture that reportedly is capable of 250,000:1 sequential contrast …**

Contrast Ratio

There is currently only one video projection technology that can guarantee ultra-high sequential contrast - the CRT. Measured sequential contrast for CRT projectors can exceed 1,000,000:1. That is why so many digital domes continue to use CRT technology to this day. Unfortunately, CRT technology is nearing obsolescence with only two active manufacturers. These projectors also suffer from low brightness, which is not such an issue with star projection, but is an issue with most other programming in larger domes. Despite the mature technology of a CRT, there are many full-dome theaters that struggle with maintaining, servicing and aligning these projectors. For new theaters there are definite reasons to seek an alternate projection technology.

Other high-contrast alternatives are emerging. On the high-end, the Zeiss ADLP has already achieved the 50,000:1 “holy grail” sequential contrast. DLP projectors (utilizing Texas Instrument’s Digital Light Processor micromirror technology) are now boasting 6,000:1 sequential contrast, but this typically comes only by throwing away much of the brightness with specialized iris. A 3,000:1 value for DLP technologies is perhaps more practical. And LCoS (Liquid Crystal on Silicon) based projectors such as the Sony SXRD and JVC D-ILA are typically 2,000:1. Edge-blended systems necessarily sacrifice contrast ratio in order to achieve color matching between projectors, so expect the system contrast to be perhaps 80% of the individual projector contrast. On the low end, many of the small fisheye systems have 2,000:1 or less sequential contrast. While the starfields produced by these systems would never be mistaken for the real thing, the lack of realism does not seem to interfere with most pedagogical goals, which is where the digital systems really shine.

How long will it be before digital projector contrast can compete with optical instruments for low-end and mid-market systems? This could happen quite soon, actually. One contender is the SEOS-patented RGBK four-panel projection engine architecture that reportedly is capable of 250,000:1 sequential contrast (www.seos.com/Zorro). This technology is similar to the use of double-mounted slides which effectively multiplies contrast.

**Institutional Priorities**

In the final analysis, the choice between digital and optical depends upon institutional priorities. For planetariums that are brand-ed as star theaters, an optical projector might be a high priority, perhaps supplemented by a digital system if additional display capabilities are desired. This would also be the case for educational institutions that must teach celestial navigation and require a highly realistic simulated night sky. For planetariums that focus on astronomy and astrophysics education beyond naked eye astronomy, it is difficult to ignore the plethora of digital alternatives that are now emerging in the marketplace. For those institutions that have found it difficult to raise capital for renovations or upgrades in the past, the case for upgrading to digital couldn’t be stronger.
Introducing
Digital Universe

Make plans to tour everything the universe has to offer!

In association with the American Museum of Natural History, Sky-Skan introduces Digital Universe, a three-dimensional, immersive presentation of the most significant and revealing data sets in astronomy. This sophisticated tool integrates the latest astronomical data from scientists and observatories worldwide to provide a level of accuracy and scale never before possible. Driven by Sky-Skan's DigitalSky 2, it provides a smooth, animated movement through all objects, plotted in their proper perspective.

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You'll want a powerful system designed and optimized to work with Digital Universe: Sky-Skan’s DigitalSky 2. Its combination of hardware and software makes Full Dome digital projection a cost-effective reality and a great way to showcase Digital Universe.

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Contact Sky-Skan about Digital Universe.

Americas/Asia/Pacific:
Sky-Skan, Inc.
31 Lake Street
Nashua, NH 03060-4513
USA
Tel: 603.882.8830
Fax: 603.882.8832
E-Mail: office@skyskan.com

Europe:
Sky-Skan Europe GmbH
Einsteinstrasse 28
D 81675 Munich
Germany
Tel: 49-89/46280231
Fax: 49-89/46280232
E-Mail: office@skyskan.com

Australia:
Sky-Skan Australia Pty. Ltd.
222 World Square
North Melbourne, VIC 3051
Australia
Tel: 61.3.9320.5591
Fax: 61.3.9320.5590
E-Mail: info@skyskan.com

Visit Sky-Skan on the web at www.skyskan.com
GLPA Workshops:
The GLPA 2005 conference in Grand Rapids, Michigan, was a huge success due to the marvelous work of Dave DeBruyn, Director of the Roger B. Chaffee Planetarium, and his dedicated staff. I want to thank them and Gary Tomlinson for his assistance in conference planning and specifically in assisting us in holding such a successful series of workshops in the portable planetarium.

The three sessions for portables were:
1. “Interactive Cosmology Activities”
   Jeanne E. Bishop (Westlake Schools Planetarium, 24525 Hilliard Road, Westlake, Ohio 44145 USA; email: bishop@wlake.org)
   Cosmology is at the forefront of current astronomical research and theory. Each year astronomers learn more about the early stages of our universe and the nature of matter and energy. With other planetarians from GLPA, Jeanne attended outstanding cosmology workshops at the University of Chicago in September of 2003, 2004, and 2005. Jeanne shared some activities that she developed which help to communicate the important cosmology ideas that she learned. The presentation related these hands-on and minds-on activities, along with the cosmology topics they convey, to Piagetian developmental levels of thinking.

2. “Storytelling Under the Stars”
   Dayle L. Brown (Pegasus Productions, 849 Trailridge East, Mishawaka, Indiana 46544 USA; email: dayle@starglobal.net)
   Dayle shared stories from around the world about some of the old favorite constellations, and other planetarians brought a few of their own stories to share.

3. “Interactive Techniques Under the Dome”
   Susan Reynolds Button
   Participants in this workshop prepared materials that could be used to facilitate making observations, measurements, and predictions and recording of data during interactive planetarium lessons.

Virgin Islands:
This past November I was invited to work as a consultant at the University of the Virgin Islands by Dr. Robert V. Giacos (Outreach Coordinator, Division of Science and Math, UVI/NASA ERC Director, University of the Virgin Islands, #2 John Brewer’s Bay, St. Thomas, Virgin Islands 00802-9990; email: rgiacos@uvi.edu) to work with a giant STARLAB and the Fiberarc projector that was purchased with funding from both NASA and NSF. Bob and his assistant on the St. Croix campus, Ms. Jacqueline Kowalski, were excellent hosts.

As Bob tells it, “Dr. Nora Thomas initiated the purchase of the STARLAB mobile planetarium more than two years ago. Her vision was a marvelous tool to excite the interests of children and adults about the wonders of exploring our solar system, the planets, the stars, the universe... and she was so right on.”

On Sunday, November 13th, we initiated the “STARLAB coming out party” with a series of educational planetarium presentations and a community day celebration in UVI’s Cafeterium on the St. Croix campus. STARLAB was made available to public and private school children for the next two days (November 14th and 15th). A second community evening event was held on November 15th. Bob reports that 605 school visitors (students plus teachers and support staff) and 125 members of the St. Croix community (for a total of 730 people) visited STARLAB during the three days on St. Croix.

On November 16th, STARLAB was shipped to St. Thomas by boat and picked up on the morning of November 17th. My husband and I traveled by Seaplane; what an exciting ride! We set up STARLAB on the open-air stage of the beautiful Reichhold Center for the Arts.

On Thursday afternoon, all day Friday, and Saturday morning, public and private school children on St. Thomas enjoyed lessons in STARLAB. On Saturday afternoon, a community day celebration introduced STARLAB to the general public. Bob calculated that 618 school visitors (students plus teachers and support staff) and 177 members of the St. Thomas and St. John communities (for a total of 795 people) visited STARLAB during the three days on St. Thomas.

Bob relates, “In total, STARLAB presentations were delivered to 1,525 Virgin Islanders! ... and we could have served hundreds more if we could have arranged STARLAB availability for a few more days on each island. The planetarium sessions were filled with the oohs and ahhs of children and adults alike, and participant evaluations were all very positive. Kids, teachers, parents, and community members are all anxious to have STARLAB become a regular part of the yearly educational events in the Virgin Islands, and since UVI owns STARLAB, we hope to make a yearly event a reality.”

The possibilities for this program are endless and I know that, through the STARLAB project, the University will develop many valuable partnerships. Math and science education for students, teachers and the community at-large will be greatly enhanced as this amazing teaching tool is used to its fullest. I look forward to hearing about future developments and welcome the University and future community STARLAB educators to the international community of planetariums!

Teaching Opportunities
In Italy - Italy Contest
Final Reports:

Susan Reynolds Button
Quarks to Clusters
8793 Horseshoe Lane
Chittenango, New York 13037 USA
(1) 315-687-5371
(1) 315-432-4523 (fax)
sbutton@ocmboces.org

Mobile News

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Teaching Opportunities
In Italy - Italy Contest
Final Reports:
“American STARLAB Educator at Serafino Zani”
Corey Radman (Consultant, Discovery Science Center, 1661 Kirkwood Drive, Fort Collins, Colorado 80525 USA; Phone: 1-970-224-5083; email: charradm@comcast.net) was the winner of the 2005 American in Italy Contest. This is her final report of that adventure.

“My visit to Brescia’s schools and science center sites was enjoyable and educational for me and hopefully the students as well.

Monday’s informal discussion using the astronomical photos was one of my favorite times in the week. I always have fun being spontaneous with lessons. The closer-farther game I improvised is from a Space Science Institute lesson, which can be found under “Two Astronomy Games” at: (http://www.spacescience.org/education/instructional_materials.html.)

One other resource Loris may find interesting can be found here: (http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Solar.System.LithographSet.html). It is a series of NASA photos of the solar system that print beautifully for solar system lessons.

“Tuesday-Thursday using the STARLAB at Liceo Scientifico Calini was very much like teaching at high schools in the United States. I was pleasantly surprised at the enthusiasm the students showed for a more cultural, story-heavy approach to the Native American skies STARLAB show. They seemed, for the most part, to appreciate the stories, especially Coyote Dances with the Stars. I could really see the difference pre-reading the text made for them. When I was speaking ad lib they followed me very slowly. However the written stories I provided allowed them to relax and listen more confidently. Overall, I thought the students’ understanding of English was very good. The lesson I presented could possibly have had more scientific content, but it seemed to balance the needs for American culture, science, and entertainment fairly well.”

“Friday’s lesson with the ‘magic walls’ was a fun experience for me. I think it is a very creative use of the STARLAB projector in a place where the dome just won’t fit. With more practice, I could see using this idea in the future.”

Friday evening at the Lumezzane Planetarium came late in a long week for me. I was sad to be too tired to fully appreciate what a wonderful facility it was. However, I did enjoy having use of a fixed dome and seeing the use of the STARLAB projectors inside it.

“My favorite parts of the trip to Brescia were interacting with my hosts. I enjoyed very much talking to Loris, Enrico, the schoolteachers, and the students. Learning about the similarities and differences between us was reason enough to go. Thank you.”

“A Week of Exchange of Interactive Astronomy Lessons in Brescia”
Final Report from French operator Samuel Peronnet (Centre d'Astronomie, Plateau du Moulin à Vent 04870 ST-MICHEL L'OBSERVATOIRE; Phone: (33) 4 92 76 69 69; email: s.peronnet@centre-astro.fr; website: www.centre-astro.fr)
“On the initiative and with the invitation of Loris Ramponi of the Observatory Serafino Zani of Lumezzane, I, as an educator from the Center of Astronomy at the St-Michel Observatory, had the opportunity to take part in three days of exchange in Italy. The Observatory of Lumezzane dealt with the expenses of the stay (meals and hotel).”

“During these three days, Loris Ramponi concocted a course for us at locations in Brescia and Lumezzane where various interactive lessons dealing with astronomy take place.

**Wednesday - 1st day**

**Morning: Reception of a class to the planetarium of Lumezzane**

“I started by presenting a model of the solar system on the scale of one to one billion (1,000,000,000), which I brought along in my luggage. It is consisted of nine planets and an inflatable model of the Sun (1.4 m diameter- see photo). All during the week, this very visual model enabled me to easily cross the language barrier with the young (and the older) Italian students. (Than is not to say that I am underestimating the invaluable presence of Loris as an interpreter.)”

“Then, Loris took a turn as we approached the basic concepts of celestial movement with STARLAB, before giving me the word so that I could invite the pupils to take a voyage around the Earth while stopping in several countries and territories where French-speaking people reside, to observe the sky at various latitudes. It is for me the first occasion to teach with a STARLAB planetarium, an excellent teaching tool!”

**Afternoon: Visit of the Observatory Serafino Zani of Lumezzane**

“After a one-hour walk, our group arrived at the Observatory. The Sun shone sufficiently to project the shade of the style on the sundial and we were able to learn how to read the hour. However, the sky was not sufficiently clear for observation of the Sun. Which of us has not met the frustration of the public when we were unable to provide the planned experience of live celestial observations because of a cloudy sky? Loris found a solution: in addition to visiting the 400 mm telescope under the cupola, observations of natural elements (objects of everyday life) under a microscope were proposed. This is a marvelous alternative, where the children, who have for the majority never seen the sky at the eyepiece, can still capture the art of observation with an optical instrument. This activity also constitutes a very good preparation for astronomical observation, faithful to the valuable multi-faceted character of Loris.”

**Thursday - 2nd day**

**The astronomical treasure of Brescia**

“Should Loris have been a journalist? In any case, he proposed that I participate in a movie, to carry out a short video sequence of a walk through the model of the solar system on the path of the “house of nature.” The house of nature is another place for educational activities which is located in a forest not far from the downtown area of Brescia.”

“Then, I had free time to discover the ‘astronomical’ treasures which the town of Brescia conceals: the meridian of the church San Giuseppe, the astronomical clock of the place of the Loggia, and other curiosities. Old instruments of the museum Santa Giulia unfortunately were not visible because of an exhibition on Van Gogh and Gauguin. (To be noted: The town of Brescia lends free bicycles for one day!)

“At the end of the afternoon we had an appointment in a new place, a bookshop whose back shop makes it possible to accommodate an extra-curricular public. Some children presented themselves for the activity suggested: tell the Greek mythological legend of Orion and Scorpion, in French obviously (fortunatly “subtitled”), also another presentation of the model of the solar system.”

**Friday - 3rd day**

**Morning - Primary School of Brescia**

“A presentation of the solar system and apparent movements of the Sun and stars under various latitudes, Loris proposed with this class (equivalent to fifth grade, ten years old), which he will follow all the school year, to work on objects visible to the naked eye. About fifty laminated images of these objects with documentation were placed at the disposal of the pupils. Each student must choose an image and write a short text to present it. After this individual working time, each one is invited to say his/her text while the image is filmed. I gave the translation of the short text in French. These pupils will compile, during the year, a book of the drawings. They will be sent to the pupils of a class in the school of St-Michel, the Observatory that I am visiting shortly after my return to France. The latter will be invited to return a similar book to their Italian comrades.”

**Evening - the Observatory of the castle**

“I was invited to present the activities of the Center of Astronomy to a public audience of people who want to learn about the sky preceding a weekly visit at the Observatory ‘Specola Astronomic Cidneo Angelo Ferretti Torricelli.’ The observatory is located inside the castle of Brescia on the hill ‘Cidneo’ above the center of the city. I became acquainted with the active network of amateur astronomers who take care of observations in Brescia and Lumezzane. Because of the shortage of time, we had to be satisfied with discovering a special instrument at this observatory (which is, from 1953, the first Italian observatory intended for the public), that has a 12 cm lens and a clever system of mirrors for returning the sunlight into a room under the cupola where the spectrum of the sun can be projected.”

**Conclusion: very concrete astronomy**

“In addition to the cordial reception of Loris Ramponi, the richness of this initiative is due first of all to the very concrete aspect of this exchange, thanks to the direct contact with pupils.”

“The idea of an exchange (of drawings and more?) between Italian and French classes will allow us to maintain this contact.”

“If astronomy supposes and makes it possible to be in space, then on Earth, the activities suggested by Loris Ramponi are also integrated into the close environment. Indeed, the exploitation of various places of activities around Brescia and Lumezzane make it possible to conduct experiments and to vary the points of view.”

“With regard to the multi-field aspect of animations offered, the practice of observation under the microscope, and in general, the study of the natural environment, remembering the bonds with visual arts, brings an undeniable opening (and very practical in the event of bad weather!) for the children.”

“I could not conclude this praise of practiced pedagogy with Brescia without underlining the very important place left to the pupils for auto-documentation. Personal research, more than is recommended in the handbooks of pedagogy, is put into practice here in spite of the adaptation and time constraints which it involves for the pedagogue.”
"Animateurs/trices of France and of Navarre who wish to bring freshness and reflection to your animations, do not hesitate to apply for this rich personal week of exchange in Brescia which will again be proposed in the upcoming year ..."

The exciting and amazing adventures of the Voorhees Astronomy Club:

Teri J. Bellows (Science Department, Voorhees High School, 256 County Road S13, Glen Gardner, New Jersey 08826 USA; Phone: 1-908-638-6116; fax: 1-908-638-8689; email: tbellows@nhvweb.net) and I met at the MAPS 2005 conference and at that time she related an extremely inspirational story to me. Perhaps you will be inspired when you read about this marvelous program. If you are not already fully tapping your student resources and igniting their desire to learn more about math, science and technology … this may be something you can try!

Teri wrote, “As we discussed (at the 2005 MAPS Conference), attached are some documents that detail the exciting and amazing adventures of the Voorhees Astronomy Club. (If you would like to see the entire set of documents Teri sent, you can email me at sbutton@ocmboces for copies.) Two of the attachments are excerpts from a grant proposal I have written so the club may have their own STARLAB instead of borrowing an old model from Raritan Valley Community College on a yearly basis. We use it regularly, even over the summer, when students may sign it out to earn money through their presentations to summer camps. Don’t you wish we had that opportunity? I wonder how full the field would be today if we had! So far I have heard there is interest in the grant … even from two Congressmen (it was made a part of the New Jersey budget proposal … that was defeated - oh well) … but no checks! Good thing we astronomers are always looking up!”

“The club started as an idea … OK, as an IDEAS grant … and has been a rousing success story. Astronomy is alive and well here, and the excitement follows our students. Some went into teaching, some astronomy, but all look up at the sky with a new sense of wonder. Back down on Earth, I am sure they also would vote to increase NASA’s budget, too.”

“The last club president and dedicated four-year member graduated in June of 2005 and is considering a career in politics. Imagine, a politician with a strong astronomy conviction. Our deal is I work on his campaign and he gets me a STARLAB. Maybe even a roof observatory?!”

“Rich Bavier dressed as an ancient Greek to explain how the stories and myths were intelligent ways to connect patterns with navigation so stars could help explorers and travelers find their way easily. They are not made to be silly tales, but usually also have a moral.” Photo by Teri Bellows.

“Three totally exhausted workers are two astronomy class students that came to volunteer as guides. Leading the guests around to the various stations and telling them interesting facts along the way. They are Darcy Mojkka and Samantha Milita.” Photo by Teri Bellows.

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we have eight telescopes (Board of Education support, Project ASTRO/IDEAS grants and donations) and seven good binoculars. I don’t worry about storage security because I sign them all out to the kids to play with; then when we do a star party they are the experts of the signed-out scope. I have had parents hug me when they came to pick up the scope, saying what a wonderful program this is. But the best is the student that can barely keep from jumping up and down. And the students are not all the same, but range in age, interest, and ability, special education to valedictorian, homecoming queen to athlete, actor to geek — they all come, they all work together.”

“Ok, I’ll stop here — but this is just an incredible experience for me too. And it all started with Project ASTRO NOVA and the amazing team at NJACE at Raritan Valley Community College that started all the funds and the training for the club back in 2000, and they still provide support.”

Voorhees Astronomy Club Star Party
Teri sent further information about a special club event, a star party. She explains, “The event lasted from 6-9 PM ... we had over 75 guests (grades 4 and 8), divided into 6 groups (some parents and younger siblings chose to roam and not be in a specific group), and each group spent 15 minutes at each activity. The activities were an astronomy-theme game, telescope observing of the Moon, Mars, Albireo and the Andromeda Galaxy, STARLAB, a PowerPoint presentation about Pluto, Earth-Moon scaling activity with Play-doh, and a solar system scaling activity with toilet paper. Each group had a name and color (Pink Planetees, Blue Moons, Yellow Suns, Green Martians, Purple Pulsars and Orange Shooting Stars), and was led by two informative student guides. Each person in the group took a short pre-test ... and later, a post-test.”

“We only charged $1 per person, as it is our fundraiser, and this covers the cost of the starburst candy for the bingo game, decorations, labels and general supplies for the party. Next year we plan to charge $2 per person so we can purchase a solar filter or maybe a small Dobsonian. Our main focus, though, is still our grant for a STARLAB!”

Congratulations Teri to you, the students, and the Voorhees School District for providing this exciting opportunity for students, parents and the community to experience real science, math and technology in such an engaging way. Good luck with your grant, you all deserve your own STARLAB!

Signing Off:
So tell me, what exciting things are going on in your portable planetarium?
And do not forget these dates:

**A Week in Italy for an American, French and Spanish Planetarium Operator**
- April 15, Yearly deadline for the applicants of “A week in Italy for an American Planetarium Operator”.
- August 31, Yearly deadline for the applicants of “A week in Italy for a French Planetarium Operator”.
- NEW! September 30, Yearly deadline for the applicants of “A week in Italy for a Spanish Planetarium Operator”.

For more details go to the following website: [http://www.colibrionline.it/MG/Week_in_Italy.htm](http://www.colibrionline.it/MG/Week_in_Italy.htm) or [http://www.STARLAB.com/slwork.html#Anchor-11481](http://www.STARLAB.com/slwork.html#Anchor-11481).
Digital STARLAB

Planetarium

From the company that created the world’s bestselling and first truly portable planetarium, Learning Technologies is pleased to bring to market a compact, manually-operated digital projector designed to produce the best quality starfield images of any projection system in its price range. Digital STARLAB was developed through a grant from the National Science Foundation’s Small Business Innovative Research (SBIR) program. The projector is compact and lightweight and is therefore, easily transported and/or stored. It features:

- A custom fisheye lens (patent pending) creating small bright stars that remain spherical right down to the horizon.
- Superior contrast that creates a truly black background making the star images even more realistic.
- Full, 180° coverage on the dome without any cutouts or blind spots along the horizon.
- A user-friendly laptop interface powered by a customized version of the renowned Spitz planetarium software called STARLAB Starry Night Dome™ from Imaginova, the world’s leading astronomy software developer.
- Versatile software that allows users to choose from a set of pre-scripted lessons designed to meet national science standards or to design their own presentations.
- Pre-scripted curriculum modules, based on Learning Technologies’ existing teacher-created lessons, that will be available on an ongoing basis to allow users the ability to run planetarium programs via HTML-linked pages that include global cultural constellations. The first full unit is based on Astronomy of the Americas from Volume 11 of Planetarium Activities for Student Success. It explores five American peoples and their knowledge and beliefs.

Digital STARLAB is the latest innovation from Learning Technologies. The STARLAB Planetarium has long been considered the industry standard and is the world’s bestselling portable planetarium. For over 28 years, the staff of Learning Technologies has been committed to bringing the best quality products and customer service to the educational and planetarium community. With the most extensive global network of trained dealers and representatives, Learning Technologies is unparalleled not only in its support of its customers, but in its commitment to producing high-quality, teacher-tested curriculum and support materials.

Contact Learning Technologies for more information.

Learning Technologies, Inc.
40 Cameron Avenue • Somerville, MA 02144 • USA
Phone: 800-537-8703 or 617-628-1459 • Fax: 617-628-8606
E-mail: starlab@starlab.com • www.starlab.com
The Swedish nights are still long and the days short, but at this time of year slow changes are just about noticeable; soon the nights will decrease by half an hour every week. I plan to go to Turkey to watch the 29 March solar eclipse. Inspired by the picture of an eclipsed sun plus Jupiter – see the PPA part of the column below – I asked my brother Per to check if any planets are close to the eclipsed sun in March, using Starry Night. Indeed, Mercury will be some 26 degrees from the sun and as brilliant as Aldebaran. Venus will be another 20 degrees away and more brilliant than any star. Hopefully, I’ll have as nice a photo as Isaac Kikawada’s for the next issue of the Planetarian. Per will join me in Turkey, and we hope to meet IPS President Martin George there, since he plans to bring a group of Australians to Turkey for the eclipse.

The International News column is dependent on contributions from IPS Affiliate Associations all over the world. Many thanks to Agnès Acker, Bart Benjamin, Ignacio Castro, Gail Chaid, Alex Delviorias, John Hare, Shoichi Itoh, Loris Ramponi, and Eduard Thomas for your contributions. Special thanks are due to Loris Ramponi, who contributes the Calendar of Events. You are welcome back with new reports, and I look forward to contributions from other Associations as well. Upcoming deadlines are 1 April 2006 for Planetarian 2/6 and 1 July for 3/6.

**Association of French-Speaking Planetariums**

The Planetarium of the Cite des Sciences et de l’Industrie (CSI), La Villette – Paris, which opened in 1986, has been working for 20 years with a Spitz Starball projector and a lot of additional projectors. In January, 2006, a new projector and a numerical multimedia environment will be installed by RSA Cosmos, the French planetarium construction firm. Thanks to Nelly Dumas, director of the CSI Planetarium, all available projectors that were obsolete were entrusted to the Association of French-speaking Planetariums (AFP). Through AFP, 100 Simula 3262 and 10 Simula 3462 slide projectors, 8 Dataton Smartpax QC, 3 Barco 808 video projectors, and 25 SkySkan special effects projectors were distributed to 19 interested planetariums.

The Planetarium in Epinal discovered in December 2005 a strange stone in the Vosges mountains (val d’Orbey), clearly identified by the Laboratory of Mineralogy at the Strasbourg University as an iron-nickel meteorite, a very exciting event! In addition, Didier Mathieu with the same Epinal team observed a very luminous bolide in the night sky on 18 February 2005, and since then they have actively searched for the heavy meteorite very probably associated with the bolide.

Note in your calendar: the annual conference of the AFP will be held in the Planetarium Galilee in Montpellier 25-28 May.

**Association of Mexican Planetariums**

Good news originated at the XXXIV AMPAC meeting held 30 November to 2 December at the “Luis E. Erro” Planetarium facilities of the National Polytechnic Institute (IPN) in Mexico City, where its Sub Director, Jesus Mendoza Álvarez, was host.

A series of lectures on current astronomy topics were given by top level Mexican astronomers from various research institutions: the Astronomy Institute, from Mexico’s National Autonomous University, the National Optics and Electronics Institute, and the Physics and Math Advanced Studies School, from the National Polytechnic Institute (IPN), ranging from “The Universe and Copernican Reasoning” to “Interstellar Astrophysics” and other topics, alternating with varied paper presentations on educational programs, show production, management, media promotion, and public relations, given by attending planetarians. A concert was offered on the first evening by the IPN’s Symphonic Orchestra as part of the amenities that made it a memorable meeting.

Antonio Sánchez Ibarra, from the University of Sonora, took office as AMPAC’s new President for the 2005-2007 period. He had been President Elect during the last couple of years. Also new AMPAC officers were appointed for Vice President, Secretary, and Treasurer posts for one year only, since it was not possible to hold elections as the required quorum was not achieved at this meeting. Occupying these posts temporarily will be Gerardo Trujillo from the Morelia Planetarium as Vice President, Juan Jose Duran Najera from the Merida Planetarium as Secretary, and Jesus Mendoza Álvarez, from the Luis E. Erro Planetarium as Treasurer. As a probable site for the 2006 AMPAC meeting, the Merida Planetarium was proposed, to be held during autumn.

Worth mentioning are some of Antonio Ibarra’s AMPAC work plan proposals: an integration phase that is being planned to include participation of all planetarium staff at meetings; a more frequent communication through an operational AMPAC web page is considered (the web page should become our image nationally and internationally; and directories of planetariums and staff will be included). Periodic and regionalized planetarium meetings are considered to ease staff attendance and exchange points of view. Communication and liaisons are to be established between Federal and State agen-
ties as well as the Federal Secretary of Education, and private enterprise fund raising support will be emphasized, and a continued media communication will consolidate reaf-
firming planetarium activities.

On the international side, IPS liaison will be strengthened; the start of a brother planetarium project with US planetariums is being considered with the purpose of receiving temporary exhibits in exchange for Spanish-language planetarium shows for bilingual audiences in the U. S., revive Latino-Ameri-
can planetarium meetings, and attendance at the IPS Melbourne Conference. An updated Mexican Planetarium Directory is to be cre-
ated with the purpose of easing exchange of and data gathering on planetariums’ technical, educational, and human resources, and the planning of technical and educational workshops.

As immediate projects, Kosmos Scientific from Monterrey is donating an 11 cm (4.5 in) telescope to those Mexican planetariums that can provide a tax deductible receipt, to interest the public on astronomy observa-
tions. An astronomy traveling photographic exhibition will be available to those request-
ing it, as well as a planetarium show produc-
workshop. Local amateur astronomy clubs will be invited to collaborate with their respective local planetariums. A nation-
al astronomical events schedule is to be pub-
lished to foster planetarium participation for the Mercury solar transit in upcoming November 2006.

Council of German Planetariums

The Council of German Planetariums held a meeting in the Planetarium of Vienna, which has been a member of the Council for two years. The Austrian planetariums of Klagenfurt and Schwaz were accepted as new members, so that the Council now also rep-
resents the interests of the mostly frequented Austrian planetariums. The Planetarium Klagenfurt is located next to an amusement park and has about 150,000 visitors a year. The Planetarium Schwaz is a private company and is located next to a mining museum. It is well-known due to its outstanding com-
petence in public relations and marketing.

The members of the Council discussed new ways of cooperation between planetari-
ums and international research institutes, such as ESA. The aim is to produce shows as joint ventures of several planetariums, as was done in the case of the Einstein show earlier this year. Combined efforts shall take place to bring the needs of planetariums to the attention of the local and national govern-
ments. A new working group will deal with pedagogical concepts in planetariums.

The Nuremberg Planetarium had a busy year with both astronomical programs and the Laser show Queen - Heaven. Nearly 45,000 visitors attended the laser show alone. Astronomical programs have been dominat-
ed in Nuremberg by the Einstein anniversary with planetarium shows, lectures, video pre-
sentations, and an exhibition in the lobby. Some 5000 visitors came to the events in the dome and about 25,000 enjoyed the exhibi-
tion. In a cooperative effort, Augsburg and Nuremberg planetariums produced an up-
dated German language version of Hansen’s with a character called Professor Photon who explains the electromagnetic spectrum to kids. Show material with German narra-
tion is available under license of the Clark Planetarium through Volker Roehrs (info@ spacebooks-etc.de).

European/Mediterranean
Planetarium Association

Fourteen months have passed since the Greek President of the Republic inaugurated the Science Communication Center and Technical Museum of Thessaloniki (TMTh). At full swing now, the new planetarium there has attracted visitors from all over Northern Greece. Before their main digital show they are currently screening “Mace-
donia - Thrace: People and History”, an 8-
minute joint production between TMTh and the Hellenic Ministry of Macedonia and Thrace. It is a brief tour through the ages that highlights the history and the people that lived in the area, from the first prehistoric settlements at Displilio (considered by many scientists to be the oldest settlements of their kind in Europe) to modern times.

All previous productions of the Eugenides Foundation are still doing extremely well, such as the show Cosmic Odyssey that was first screened in November of 2003. For the Christmas and New Year’s season and for our younger audiences the Eugenides Founda-
tion has also produced Fairytales of the Sky, that describes how four of the constellations acquired their names, while at the same time explaining elements of astronomy in a way that is accessible to younger children.

The Eugenides Foundation is currently working on its latest production, which is scheduled to open at the beginning of Febru-
ary 2006. With the title From Genesis to Cataclysm, it is a short description of our knowledge of the birth and geological evolution of our planet, as well as a presentation of the evolutionary path that, through the mill-
ennia, led from the first forms of life to the present. Alex Delivorias claims that, in light of current issues regarding the promotion of Intelligible Design in the USA and elsewhere, our responsibility for the dissemination of real science is greater than ever. Genesis and Cataclysm will conclude with the inevitable death of the Sun and with the optimistic message that every such end is also a new beginning.

Great Lakes Planetarium Association

Illinois. The Adler Planetarium and Astronomy Museum presented four theater offerings during this winter season: Time-
Space, Journey to Infinity, Race to the Edge of the Universe, and their live sky show Space In Your Face. Plans are proceeding for a new museum and planetarium in Peoria. Construction will begin sometime in 2007. Plans call for a 13-meter dome, but equip-
ment details have not been determined. The museum will expand from 3500 m² (37,000 square feet) to 10,100 m² (112,000 square feet), and its mission will expand from arts and sci-
ences to embrace art, history, science and nature.

The William M. Staerkel Planetarium at Parkland College in Champaign recently re-
ceived sponsorship for a new show from the Staples Foundation, which not only funded the show kit but also provided funds that allowed several underprivileged groups to attend. The Cernan Earth and Space Center on the campus of Triton College in River Grove hosted a series of MarsWatch events this fall. A 30-minute PowerPoint-based mini-show preceded each public observing session, and four of the five nights were clear enough to view. Several hundred people observed Mars through telescopes.

Indiana. The Muncie Community Schools Planetarium reports that the two new Happy 15th Birthday Hubble images are now on display at the Muncie Community Schools Anthony Administration Building and the Muncie Community Schools Planetarium. The Koch Science Center and Planetarium in Evansville reports that Mike Smith has left his position, after a tenure of nearly five years, to take a position in Lancaster, Penn-
sylvania. The Evansville Museum is in the master planning stages for a significant new planetarium and immersive theater com-
plex. Their exhibition on Light Pollution, Our Vanishing Sky, was recently the recipi-
ent of an Executive Director’s Award from the International Dark-Sky Association.

The E.C. Schouweiler Memorial Planetari-
um at the University of St. Francis in Fort Wayne reports public shows during Fort Wayne’s annual ten day Three Rivers Festi-
val were very successful. The Schouweiler team recently completed a successful run of Planetarium Weekends, which were held one weekend a month from September through November. Because of this, 2005 became the first year in their 30+ year histo-
ry that public shows were offered nine months of the year.

The Carmel Planetarium has undergone a major renovation this summer. They re-
placed their old dome and resumed opera-
tions in time for the new school year.
Recently, the staff learned that their planetarium will receive their new GOTO Chronos sometime after the first of the year. **Michigan.** In Dearborn Heights, the staff at the Ensign Planetarium has begun seeing all the ninth grade earth science students. By the time they're done, these students will have visited the planetarium three times. Some of the fifth grade classes couldn't get busses, so planetarium director Carrie Zaitz made "classroom calls" and reviewed motions of the earth, sun and moon using models and chalkboards!

In January, Flint’s Longway Planetarium opened *The Dinosaur Chronicles* from the Taylor Planetarium in Bozeman, Montana. Girl Scout Merit Badge Workshops continue, as do their ever-popular Telescope Workshops. Southfield’s Vollbrecht Planetarium announces its biggest news since their 1968 opening, a $50K windfall summer renovation project that included new flooring, 70 upholstered seats, furnace/air conditioning, painted walls, cove lighting, four stereo speakers, and many electrical upgrades. In Jackson, the Peter F. Hurst Planetarium director Mark Reed has been busy modifying portions of his show library to take advantage of Spitz A4 projector automation, which was completed by East Coast Controls last summer.

This fall, Detroit’s Dassault Systemes Planetarium’s *Blown Away* weather show kit has gone international with a recent sale to Denmark. In November, they hosted a Space Blast-Off Educators Workshop. This autumn also witnessed the installation of a permanent Space Lab exhibit adjacent to the planetarium. In January, Cranbrook Institute of Science Planetarium hosted a Telescope Users Workshop as well as offering the Masters of Science Education astronomy course. The staff is also involved in an internet radio show, *The Event Horizon,* as well as an original astronomy podcast, *Cranbrook Space Odyssey.*

**Ohio.** Gene Zajac reports from the Shaker Heights Planetarium that the store-bought Hershey Bar has attended monthly meetings of the Cleveland Astronomical Society. His astronomy club is selling T-shirts to raise money for their spring show. Shaker physics teacher Joe Marencik is president of the Ohio Section of the American Association of Physics Teachers, and he hosted their annual convention at Shaker Heights in October.

Joe Marencik is president of the Ohio Section of the American Association of Physics Teachers, and he hosted their annual convention at Shaker Heights in October.

Jim Gavio reports that the Erie (Pennsylvania) Planetarium showed *The Sky Above Mister Rogers’ Neighborhood* during the summer. There was a big opening day for the Mister Rogers show as a local restaurant supplied free cookies for all, local PBS station provided activities for the kids, and Mr. McPeely from the show itself appeared as a special guest. This fall, the planetarium also presented the in-house production *Erie Legends.*

**Minnesota/Wisconsin.** The Paulucci Space Theatre in Hibbing, Minnesota, will be running *Season of Light* and laser shows during the holiday season. Several used Sony video projectors have recently been acquired and will be mounted behind the 12-meter dome. In Brainerd, Brian Wallace recently opened a new planetarium with an Evans & Sutherland Digistar 3 SP2 projector. The Minnesota State University Moorhead Planetarium is running its annual *Star of Christmas* presentation. In January, the planetarium started its yearly children’s feature.

**Italian Planetaria’s Friends Association.**

The next “Day of Planetaria” will be held on 19 March 2006. Some Italian planetaria have already prepared their program, such as the cities of Modena (www.planetario dimodena.it), Perugia (www.avolt.pg.it), and Treviso (www.astrolitirevigiani.it).

A prize for a graduation thesis about planetaria has been organized by Italian Planetaria’s Friends Association and approved last October during the National meeting in Brescia. Possible subjects are: architecture, activities, teaching, instruments, communication of science, management, shows, history, and so on. Applicants must send the required documentation before 31 July, 2007, to Centro Studi Serafino Zani, via Bosca 24, 25066 Lumezzane. The prize for the winner will be a study workshop in a European city with a planetarium. We are interested in collecting proposals from European planetaria that can host the winner for some days. Transportation and stay fees will be paid by Italian Planetaria’s Friends Association.

A new map of the distribution of planetaria in Italy is ready. The map is divided into more than 100 small areas called “province”, for example Milan and Rome, and 20 big areas called “regioni”, for example Lombardia and Lazio. For each “province” where there are planetaria, a symbol (a pointed star) indicates the size (diameter up to 6 meter; from 6 to 10 meters; more than 10 meters) of the main existing planetarium, the number of planetaria (five-pointed star indicate the presence of 5 planetaria in the “province”), and a square indicate the presence of mobile planetaria in the “province”. At the moment the map indicates the location of more than 100 planetaria, and it will be regularly updated. The map is also available on the web page “News” at www.pianetaritaliani.it.

**Japan Planetarium Society.**

The Japan Planetarium Society (JPS) hosted a tour of the Subaru Telescope at Mauna Kea on the island of Hawaii. Masako Kitahara, the president of JPS, and thirteen people of the planetarium staff and friendship members at planetariums joined the tour. Prof. Hiroshi Kariyjs, the director of the Subaru Telescope, and Associate Prof. Saeko Hayashizhi introduced them to the Subaru Hiro site for observation and administration, and to the telescope site at Mauna Kea, not only to view the telescope but for a behind-the-scene tour as well. They also visited Kilauea Volcano and the Bishop Museum in Honolulu.

During 5-7 September 2005, the workshop for popularizing the latest astronomy, “The Search for Extra-solar Planets,” was hosted by Nishiharima Astronomical Observatoy Park in Hyogo. Forty-two participants, consisting of staff from planetarium and science centers and graduate students, gathered there. This workshop was organized by the Work ing Group (Representative: Shiomi Nemoto at Kawaguchi Science Museum) of JPS for popularizing the latest astronomy, Specific Field Research Group Development of Extrasolar Planets Science (Representative: Assistant Prof. Munetaka Ueno at University of Tokyo) that is the grants-in-aid project by Ministry of Education, Culture, Sports, Science and Technology, and the National Astronomical Observatory of Japan (NAOJ). The opening address and the first lecture were delivered by Organizers and Prof. Norio Kaifu, the executive director of NAOJ. The workshop included more than eighteen hours of lectures, practice, and social gatherings. It was done in conditions of windy and rainy weather from an approaching typhoon.
Nordic Planetarium Association

Just in time for sending the International News manuscript to Planetarian editor John Mosley, the very first Scandinavian digital color projector arrived to Borlänge. Today (21 January) Per and Lars Broman spent most of the day erecting Dalarna University’s 5 m Eurodome at the attic of Falun Copper Mine Museum, where the projector will be used for teaching science communication students modern day planetarium technology beginning next week. More on this will be presented in the next Planetarian issue. For this issue, another exciting Nordic planetarium event, that was first mentioned in Planetarian 4/2005, will be presented in some detail. Ole Knudsen, director of Steno Museum Planetarium in Aarhus, Denmark, has given this account of how Greenland's first planetarium became a reality:

**Ulloriarsiooq in ultima Thule.** It is igloo time in Greenland, and since October an indoor igloo is now also available: A StarLab system named Ulloriarsiooq (pronounced Oos-lu-ri-aar-see-ook): The Stargazer. An idea from several years back came suddenly to fruition in the autumn of 2004, when I chanced on meeting Michael Linden-Vørnle from the Tycho Brahe Planetarium, Copenhagen, on the day before he went to the Greenland capital Nuuk to give a lecture. Michael was hooked on the idea and brought it with him to what turned out to be just the right people. A grant application was written out, and in February the money was available.

“The planetarium now resides with the central for educational material, Inersaavik in Nuuk, and teachers up and down the 3000 km long coastline can now order the transport container delivered by ship. Eventually we hope to be able to beat the record of the Northern Lights Planetarium in Tromsø, Norway of being the northernmost planetarium in the world. Far up Thule (Qaanaaq) lies at latitude 77.5° and the northernmost permanently inhabited village of Siorapaluk (population 60) is even 33 km further north, at 77.8°. We’ll let you know when the record is beaten!

“For the Ulloriarsiooq project we purchased the standard StarLab dome, the FiberArc projector, and 12 cylinders, covering a.o. plate tectonics, bird migrations, sea currents, the living cell, and two clear cylinders, plus the more astronomy-oriented Lewis and Clark, Navajo Skies, Southern constellations, solar system, Greek constellations and the standard Northern star field. This reflects our aim not only to provide a traditional planetarium, but also a portable multimedia environment for an area where children have no easy way of traveling to, say, a science center.
Preparing in advance for the very difficult supply situation in Greenland, a lot of spares were added.

“Michael and I spent ten wonderful days in Nuuk in early October preparing the final delivery of the StarLab and giving introductory courses to 45 teachers and student teachers from the local area. Hopefully we will return early next year for local courses in Illulissat in the North and Narssassuaq in the south. The main grant from the Nuna Foundation was given to INUTEK - the Technological Society of Greenland, and other sponsors graciously donated travel and transport and lesser but not least-appreciated amounts. These include: Air Greenland, Blue Water Shipping, and Kimik IT.

“Members of the INUTEK board, noticeably chair Lone Abrahamsen, provided project control and support logistics; took us into their private homes as guests; showed us the town and the sights; and became very good friends, for which we are tremendously grateful. The next phase in the project hopefully is the research, design and production of a new StarLab cylinder with themes from Inuit mythology, covering not only Greenland, but all of the Arctic. For this and in all other matters Learning Technologies, Inc., home of StarLab, has been tremendously helpful.”

**Pacific Planetarium Association**

When Dr. Scott Sandford, NASA scientist and co-investigator for Project Stardust and Project Astro partner for Independence Planetarium’s astronomy class of 1997, presented the timeline of the Stardust mission, the landing on 15 January 2006 seemed far away. Nine quick years later this mission is ready for the next step - the laboratory investigations. Project Stardust flew through the coma of Comet Wild 2, collecting samples from the comet using aerogel, a silicon-based solid with porous, sponge-like structure in which 99 percent of the volume is empty space. Invented in 1931, aerogel looks like solid, pale-blue smoke, but it is ideal for capturing the tiny particles in space. Dr. Sandford shared aerogel with the astronomy students at Independence Planetarium, and they followed his progress as he flew to Washington DC to help present the proposal of the mission for funding approval.

Dr. Sandford continues to bring students and the public up-to-date on the progress of Project Stardust at NASA-Ames open house events. He will now be involved in the laboratory investigation of the particles recovered from the mission. Instruments such as electron microscopes, ion microprobes, atomic force microscopes, synchrotron microprobes, and laser probe mass spectrometers will provide direct information on the nature of the actual particles that initiated the formation of the Sun and planets 4.6 billion years ago. Dr. Sandford provided a tour of the NASA lab where he works to Independence Planetarium astronomy class students in 1997, so students could see firsthand where the particles would be examined after Stardust landed on the Utah salt flats. This study of the particles, according to NASA, “will provide fundamental insight into the materials, processes and environments that existed during the origin and early evolution of the solar system.” Independence Planetarium astronomy students were privileged to be involved through Dr. Sandford’s enthusiastic presentations about this significant project.

Project Astro astronomers are ever involved with Independence Planetarium even if they are working with other schools in the Bay Area. Isaac and Heidi Kikawada is such a couple. Isaac and Heidi are amateur astronomers, and although only Isaac is officially a Project Astro astronomer working with a Mountain View middle school, he keeps active with Independence Planetarium as well as bringing guest speakers and resources to the planetarium.

Recently, he helped director Gail Chaid write a newsletter for the planetarium about telescopes and binoculars and resources for beginning hopeful amateur astronomers and families. The planetarium gets requests for advice about which telescope to buy as a gift for a family member, so Isaac Kikawada and Chaid combined resources to write some recommendations for the public using local sources. In the process, Isaac shared his information about binoculars. On a trip to Africa to see an eclipse, Kikawadas took a lightweight, inexpensive binocular holder - a mop! Brian Day, NASA contractor and Orion telescope representative was also viewing the eclipse on the same trip. Brian has also visited Independence Planetarium and continues to be a source of support and information about astronomy and telescopes for the Bay Area community. For additional information, contact Chaid at chaidg@esuhsd.org or http://planet.esuhsd.org or call (+1) 408-928-9604.

**Expectant visitors, large and small, are queuing up for their first planetarium experience in Katuaq, the Greenland cultural centre. Photo Ole Knudsen.**

**Heidi Kikawada studying a 2004 solar eclipse in Zambia using the Mop-Bino-Holder. Photo Isaac Kikawada.**

**A photo of the same solar eclipse, taken with a small digital camera. Note the planet Jupiter and African trees. Photo Isaac Kikawada.**
Across Silicon Valley at Minolta Planetarium at De Anza College, Karl von Ahnen reports it was time to bring laser light shows back to DeAnza College’s planetarium. There is a long history of laser shows at the planetarium but they all have been operated by outside companies. De Anza has now purchased their own laser from Casey Stack Technical Services in Utah. Stack proved good information and worked with DeAnza to get just the right system for their space. It will take about six years to pay off the laser. De Anza has been running it for two years already but the addition of the laser provides a steady increase to their annual revenue and they feel it has been successful for them. For more information contact Karl von Ahnen at vonahnenkarl@fhda.edu or call (+1) 408-864-8282. Nearby at West Valley College, new PPA president Benjamin Mendelsohn is working with Jeff Bowen on having a Bowen User Group meeting in the spring of 2006. Those interested in attending should contact Benjamin at BenMen delsohn@westvalley.edu or Jeff Bowen at Bowen Technovations or Gail Chaid using e-mail or phone.

The PPA will meet in Lincoln, Nebraska, for the annual Western Alliance Conference in September of 2006. At that time, Dean Brown from the University of Alaska, Fairbanks, will present a plan for the September or October 2007 WAC conference in Fairbanks. Since this will be around the time of the 50th anniversary of Sputnik, Brown is making plans to have special speakers and events to mark this special event in history as well as providing lots of information and speakers related to auroras. Alaska also has quite a few StarLab astronomers and teachers who will be equally involved in the conference, and PPA wants to make sure StarLab teachers and astronomers are invited to attend the conference. PPA looks forward to future communications from the WAC conference team in Alaska.

Southeastern Planetarium Association

The Astronaut Memorial Planetarium and Observatory in Cocoa, Florida, will host the 2006 SEPA Conference 20-24 June. The conference hotel is the Radisson Resort at the Port, a full featured conference center and resort in Cape Canaveral, Florida. Considering the planetarium profession’s common mission of teaching basic astronomical concepts together with the advent of high-tech full dome video systems, the planetarium has chosen Back to the Future for the conference theme.

"Now more than ever it is clear that our choice of presentation style is no longer one or the other - basic traditional vs. modern high tech. The tools of our trade are just a means to an end - teaching astronomy. That mission is being accomplished in domes of all sizes and resources. Start thinking now about how you can contribute to SEPA 2006, whether you are a vendor or an educator (or both). Whether yours is a full-featured modern space theater or if all you have is a starball and a laser pointer. We want to hear your stories about how you communicate the wonder of the cosmos to your students and public visitors. Visit the host’s website www.brevardcc.edu/planet for more information. We hope to see you in Cocoa this summer?"

Calendar of Events 2006

9-10 January. Tennessee Organization of Planetariums, meeting at the Sudekum Planetarium at the Adventure Science Center in Nashville, Tennessee, USA.

19 March. International Day of Planetaria. www.planetaritaliani.it

15 April. Deadline for the applicants of A week in Italy for an American Planetarium Operator. www.bresciascienza.it/cityline/cult/photogh.htm

7-8 May. Annual Meeting of German Speaking Planetaria (ADP), Raumflugplanetarium Cottbus, Germany, www.planetarium-cottbus.de/adp2006

8-9 May. Carolina Association of Planetaria Educators (CAPE) meeting at the Ocean Isle Planetarium in Sunset Beach, North Carolina, USA.

17-20 May. Middle Atlantic Planetarium Society Conference (MAPS), Novins Planetarium, Ocean Country College, Tom River, New Jersey, Hostess Gloria Villalobos. www.maps-planetarium.org


8-10 June. European collaborative for science, industry and technology exhibitions (ECSITE) Annual Conference, Technopolis, Mechelen, Belgium.http://www.ecsite.net

20-24 June, South Eastern Planetarium Association Conference (SEPA) will be hosted by the Astronaut Memorial Planetarium & Observatory in Cocoa, Florida, USA. Contact: Mark Howard, Director, howardm@brevardcc.edu, www.brevardcc.edu/planet


31 August. Deadline for the applicants of A week in Italy for a French Planetarium Operator. www.colibrionline.it/IMG/inter national_collaboration.htm

13-15 September. Western Alliance Conference (WAC) of planetariums in Lincoln, Nebraska, GPPA, Jack Dunn hosting).

30 September. Deadline for the applicants of A week in Italy for a Spanish Planetarium Operator. www.colibrionline.it/IMG/inter national_collaboration.htm

8 October. XXI National Meeting of Italian Planetaria, Ravenna, Italy www.colibrionline.it/IMG/planetari_news.htm


28-31 October. Association of Science-Technology Centers (ASTC) Annual Conference and Expo, Louisville Science Center, Louisville, Kentucky, USA, www.astc.org

2007


2008


For information about the next deadline: stevetiedy@hotmail.co.uk.

For corrections and new information please send a message to Loris Ramponi, loris@colibrionline.it or info@serafinozani.it.
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Condolesnces to ...

... the friends and family of Jon Hodge who passed away after a battle with cancer. Tom Donner, Interim President of Santa Monica College, California, sent the following remembrance to the academic and astronomical community. "It is with great sadness that I inform you that Jon Hodge, SMC’s planetarium director who opened up the wonders of the universe to tens of thousands of adults and children over the past 26 years, died January 4th 2006. He was 57. Jon is remembered as a charming and - even when battling cancer - ever-cheerful man who had a highly developed ability to turn complex subjects into understandable lectures and lively presentations for people of all ages. In a fitting tribute to Jon, who was on medical leave since last fall with an eye on retirement, his colleagues in the Earth Science Department arranged to have an asteroid named after him late last year. Asteroid 18117 is now called “Jonhodge.” The honor recognized him for his "enormous contribution to the dissemination of astronomical and scientific knowledge to the general public, college students and schoolchildren" - not only for his work at SMC, but also for his lectures at UCLA and Griffith Observatory. His planetarium shows were conducted not only for the benefit of SMC students, but also for the general public (Jon had quite a following) and for schoolchildren of all ages. Over the years, he has talked about every subject imaginable in the universe, many with catchy titles such as “Apocalypse Now: The Asteroid Risk,” “How Big is Space?” and “This Alien Earth.” His planetarium shows survived earthquakes and soared to new heights with the construction a few years ago of a new 50-seat facility, complete with the state-of-the-art Digistar projection system. Interestingly, Jon’s college degree is not even in astronomy. He started out as an astronomy major at USC, but switched to the history of medieval science. After graduating, he started work at the Griffith Observatory in 1971, first as a guide and then as a lecturer. He took over as SMC’s planetarium director in 1979, but continued to lecture at Griffith until it closed three years ago for major renovations. He has also worked with UCLA, organizing popular public seminars on astronomy. Hodge established himself in Southern California’s active astronomical scene, bringing in guest lecturers to SMC from such organizations as Griffith, Cal Tech, UCLA and the Jet Propulsion Lab. He was also a member of the Astronomical Society of the Pacific and the International Planetarium Society. Hodge is survived by his wife Mary; two sons, Brendan and Timothy; a daughter, Rosamund; and two grandchildren.

And our Congratulations to...

... Spitz, Inc., of Chadds Ford, Pennsylvania, who will celebrate their 60th anniversary this year! By the time you read this there should still be plenty of time left for you to plan to attend the 60th anniversary edition of their popular Spitz Digital Institute this summer. Contact Joyce Towne in the US at 888-778-7253 or online at www.spitzinc.com.

... the team of NASA’s New Horizons Spacecraft on a successful launch on Thursday, January 19th 2006. If all goes as planned the spacecraft will arrive at Pluto on July 14, 2015 and will finally reveal close-up images of Pluto’s surface features!

... Dale W. Smith of the Department of Physics & Astronomy at Bowling Green State University, in Bowling Green, Ohio on the installation of his new console! Dale writes, “This past weekend, we replaced the original Apollo console that controlled our MINOLTA II-B star projector with a new custom-designed console from Commercial Electronics in Vancouver, B. C., Canada. When we opened in 1983, Commercial Electronics installed the Omni-Q automation system for our slide projectors and other visual devices. That system is still working well and we still use it today. Because we are so pleased with Commercial Electronics’ products and outstanding customer service, we commissioned...
them to design and install the new star projector console. It replaces a vintage 1970s console with a 2006 system that we expect to give us many years of good service. Engineer Mark Yau designed and installed the new console in collaboration with Alex Hann (BSGU Planetarium's tech) and me.”

Did you know…

… that Hilmar Boo of the astronomy society at Hochwald-Gymnasium (Grammar School) Wadern in Wadern, Germany, has developed an online directory called “Planetaria Worldwide” for their Global Astronomy Project for Schools (GAPS)? This planetarium directory project links students interested in astronomy from around the world, including schools in Hong Kong, Georgian Republic, Hungary, Lithuania, and Germany. With just a few clicks at their site at www.schulseiten.de/hwga-astro/english/uns_proj_planetarien_eng.html I was able to find out that the Planetarium Freiberg, (http://www.planetarium-freiburg.de) has a children’s show about a big white bear called Peterchens Mondfahrt and that in 2000 Oman’s first planetarium was built along side of the Oil & Gas Exhibition Centre to commemorate the 30th anniversary of His Majesty Sultan Qaboos bin Said and that both the Exhibition Centre and the planetarium were originally conceived and built and are being run by Petroleum Development Oman (PDO), the leading oil and gas exploration and production company in the Sultanate (http://www.pdo.co.com/PDO/PDOCommunity/planetarium.html). The students also created a 2006 calendar featuring pictures of various world wide planetaria at www.schulseiten.de/hwga-astro/english/uns_proj_planetarien_kalend_start_eng.html. Visit the astronomical society’s website at www.hwga-astro.de/vu for all the details in three languages. Please make some time and email Hilmar and give him some encouragement at Hilmar@web.de or direct questions to HWG-Astro@web.de.

… that the second season of NOVA scienceNOW on PBS now has a new host? Dr. Neil deGrasse Tyson of the Hayden Planetarium in New York City, New York, will host this WGBH Boston production that tells stories from the leading edge of science. He replaces departing host Robert Krulwich, who is moving on to National Public Radio. Launched in 2005, NOVA scienceNOW audio podcasts have been among the most popular and most subscribed to of the thousands of podcasts available on iTunes. Both audio and video podcasts subscriptions are available through pbs.org/nova/sciencenow. Now in its thirty-third year of broadcasting, NOVA is produced for PBS by the WGBH Science Unit.

… that Spitz Inc. will be installing the Kalpana Chawla Planetarium late in 2006 in Kurukshetra, India? The new planetarium is being built to honor Indian American Astronaut Kalpana Chawla, a Mission Specialist and one of the seven crew members who perished aboard Columbia on flight STS-107. The new planetarium will be a hybrid system featuring SciDome Full Dome Video and a System 1024 star projector. For more on this project visit http://www.rediff.com/us/2003/feb/24kalphtm.

… that the Astralia Center at the Cité de l’Espace in Toulouse, France, was recently upgraded with new Barco digital video projection systems, making it one of the most sophisticated in Europe? The new 3D planetarium show opened in January, 2006. The space museum complex features a Digistar 3 from Evans & Sutherland and also houses an IMAX theater with state-of-the-art digital projectors.

… that Goldenpalace.com is now the owner of William Shattner’s kidney stone for only US$25,000! The kidney stone was auctioned off to benefit Habitat for Humanity. Talk about having the ultimate Star Trek collectable. The online gambling site that now owns the stone will add it to other oddities it has purchased including a french fry in the shape of Abraham Lincoln that it purchased for $75,100. Sounds like they got a good deal on the kidney stone!

… that the planetarium of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) in Manila, will undergo renovation next year? The planetarium at the Science Garden on Agham Road in Diliman, Quezon City, averages 15,000 visitors a year. It was first built 26 years ago. PAGASA is the government body that studies meteorology and astronomy.

People On The Move

Just last issue I reported that former IPS President Martin Ratcliffe had left Exploration Place in Wichita, Kansas. Martin remains in Wichita where he continues to teach an Intro to Cosmology class for non-science honors students at Wichita State University but he has also taken on a new role in our industry by joining Sky-Skan, Inc. of Nashua, New Hampshire, as their Director of Professional Development. Martin’s new role at Sky-Skan won’t be improving the work environment for it’s employees but rather strengthening the astronomical knowledge of users of Sky-Skan’s DigitalSky family of full-dome video products. Martin will give training classes in the use of the astronomical databases available on these systems, ensuring that DigitalSky users have the proper training to make full use of their systems. Additionally, Martin has recently published a new astronomy learning tool called The Night Sky Deck. This unique set of educational cards reveals the night sky, solar system, and deep sky objects with fold-out maps created by Charles Nix - collaborator on Ian Ridpath’s Norton Star Atlas. The set even includes a red flashlight to help make you an instant stargazer! The Night Sky Deck is available at most major books stores or online through www.barnesandnoble.com or www.amazon.com. You can contact Martin through his new email address at ratcliffe@skyskan.com or by phone at 1-603-305-4270.

Former laser programmer for Audio Visual Imagingeering, Chuck Rau now is the Producer/Educator at the Mayborn Planetarium & Space Theater at Central Texas College in Killeen, Texas. Contact Chuck at chuck.rau@ctcd.edu or by phone at 1-254-526-1510. With Minolta starprojector, an 8-70 cinema system and an Omnisca full dome laser system, Chuck has a variety of tools at his disposal to keep audiences educated and entertained. Good luck Chuck!

And finally,

The Children's Museum of Pittsburgh has won a 2006 American Institute of Architects Honor Award for Architecture. The museum won the award for its renovation and expansion, which was completed in November of 2004. The museums architectural award will be presented in June 2006 at the AIA annual convention in Los Angeles. You may remember from a few issues back how the Children’s Museum joined their original old Post Office site and the original Buhl Planetarium building with an expansive glass and aluminum connecting structure. The work was designed by Perkins Eastman Architects of Pittsburgh, Pennsylvania, and Koning Eizenberg Architecture of Santa Monica, California. Judges felt that the Children's Museum's renovated building has “natural light along with a well-designed interpretive program,” which make the museum “an inspiring place for children,” according to a written statement. The project was one of 30 winners out of a total of 680 submissions. Past winners of the award include the Getty Museum in Los Angeles (2000) and the Whitney Museum of American Art in New York (1970). For more information visit, http://www.aia.org/press2_template.cfm?pagename=release_011306 honorawards.

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A central metal rotating post supports both seats as well as a small circular wooden table. The post is held in place by a cross of wood with bent metal tubing to prevent any sway. The table includes a red light that turns on when the tabletop is pressed. The seats and table rotate simultaneously while the post and wooden base remain stationary. Plastic was cut to form long swooping shapes for the surface of the seats. The wood provided the frame: three “ribs” for each seat to support the curving, form-fitting plastic. Metal tubes were used as spanning rods across the ribs and one long support pipe between the two seats running through the central rotating post.

Construction was truly Creation over seven long days and nights of sawing metal and wood, bending plastic and fastening everything together. The students presented the chair to their class on a Friday afternoon. The long swooping shape of the chair communicates their sky-observing concept, and the rotating base gives a smooth motion and impressive momentum to the entire seating device. And the name of this innovative stargazing seating device for two? The Gemini Stargazer.

And a thank you to the talented and creative Ray Worthy, for this contribution:

Round about the time of the first onslaught of Beatle mania, I was spending a couple of years on the south coast of England in the beautiful port and holiday resort of Weymouth. I was a mature student learning to become a teacher. Previous to this, I had been in the army followed by a spell working in the Development Research Department of a Nylon Works in the north of England. Because of this, I was no longer a callow youth and exuded a certain measure of confidence.

I had enrolled in the Maths and Science Course and was thoroughly enjoying myself. Besides doing the normal course, I had fallen under the spell of an astronomer A.F. O’D Alexander, who lived in Dorchester, a few miles up the road. This was the era before all those wonderful pictures were returned to Earth from the NASA probes. At that time he was a leading authority on Saturn. He had written a definitive book on the telescopic appearance of the planet. The tome was about seven centimeters thick so it must have been good. I spent a lot of time at his home, working on various projects.

With the aid of a college grant, I built a 20-cm alt-azimuth telescope in a disused woodworking shop, which amazed everyone who saw and used it. (It amazed me as well as my woodworking skills had never progressed beyond making pencil stands.)

The Prof had the idea that, because after all, I was supposed to be studying how to teach, I should take over the astronomical part of the maths syllabus and assume the job of lecturer. I was a little taken aback because the class was mainly composed of mature students, but I accepted the challenge.

One part of the syllabus which gave most trouble was the part dealing with “The Equation of Time”. Members of the class had some difficulty with this topic and I had to pay special attention to the causes of the discrepancies between the passage of the real Sun and the ideal passage of the imaginary Sun. Explaining to them when they had to add on the time interval and when they had to subtract it. However we got there in the end.

I was still a student in the college, of course, and had to take the same exam as my “Class”.

At the end of the term, when all the marks were in, we all had to parade in the lecture room, and I ran the results. As I was approaching the lecture room, someone diverted me with a call to another department to see about a small matter. After attending to this, I opened the lecture room door to find a guard of honour lining up in two rows, and the Prof at the far end, all applauding me as I walked between them. They were all laughing uproariously.

“Congratulations, Ray,” he said, pinning an imaginary medal on my chest,” All your Astronomy Squad got one hundred percent in that section,” and then after a short pause, he went on, “But you didn’t. You got the “Equation of Time” question wrong.” I had added when I should have subtracted.

Out came a bottle of wine and a box of glasses.

“Just remember that bit in the finals.” ☉
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