

President's Message

Over the past month I've had the interesting task of wading through mounds of old documents relating to the early years of this organization. What impresses me most is the passion those early leaders exhibited in making SEPA a viable professional group. Some committee and business meetings seemed to go on forever. They wrestled with concepts, ideals, ethics... and tried to envision what our profession could become.

The reason for my sudden interest in SEPA history is multiple. Initially it was to gather information for the historical and business sections of the soon to be members guidebook, but a quick check of dates showed that, with the arrival of the new millennium, SEPA would be setting some milestones. SEPA formally came into existence at a 1971 conference held at the Fernbank Science Center in Atlanta. That means that our conference in 2001 will be the 30th anniversary. If anyone wants to celebrate early, the year 2000 marks the 30th anniversary of the informal meeting that started things rolling, and we will be holding our 30th conference.

Those of us who have been in this business a long time might want to think back about how our jobs have changed over the years. The state of the art for our profession in the early 1970s seems some distant primitive past. When SEPA got its start, the Apollo program was in full swing. By the way, did you ever think there would come a time when most of your colleagues would be born after 11 (i.e., after Apollo 11)? You young whippersnappers can think back to your growing up years and the space science of the time. I affectionately think of you as shuttle boomers. In the planetarium our tools might have been simple but the public was eager to hear about such things. Today that still holds true. We've had Hubble, Galileo, and Sojourner; it seems there are Wonder Years for each generation.

Now, try to think what the next 30 years might hold for our profession. It's not an easy thing to do! Our guesses will probably be wrong. Oh, sure, we know that technology will provide us with many new tools, but what form will they take?

Lest some catastrophe befall the human race, we will continue to expand our knowledge of the universe, but those discoveries are still beyond our ken. I haven't a clue what the planetarium aka universarium experience in 2030 will be like, but I imagine it will be really exciting.

If nothing else, I am not worried about the future of our profession. The rabid enthusiasm that our founders exhibited is still with us. I see it in those of you who work with the limited budgets and accomplish amazing things; I see it in the people who value rewarding work, quite often over worldly incentives; I see it in the time you devote to your profession, both at your facilities and for this organization; I see it in the camaraderie you extend to one another. But most important of all, I see it in the bright faces of the younger people in our ranks. Their presence tells me our profession is still growing. This new blood invigorates us all. It brings us new ideas and keeps us vital.

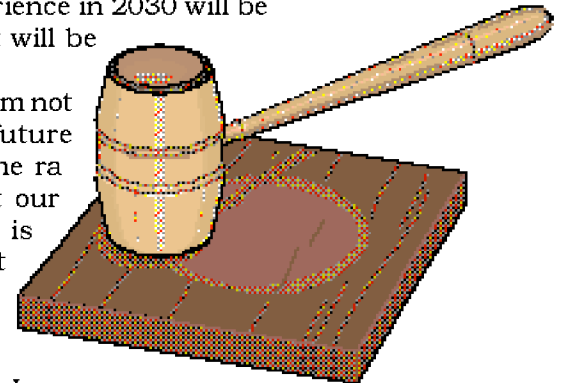
If you're new to SEPA, I encourage you to get involved. Give that first paper at a meeting, write something for the Journal, but, in some way, offer your talents to this group. That way, when you look back thirty years hence, you'll feel a real part of the SEPA saga.

Logo (Non)Contest Nets Two BIG Winners!

Members were asked to participate in the design of a new SEPA logo by submitting design ideas. The concept was to present all the ideas to an artist as a basis for choosing elements for the final design.

After six months and a contest deadline extension only two people responded to the call: Scott Landstrom and Adam Thanz. Council decided that even with this general lack of interest, it would be proper and appropriate to divide the \$50 prize money between Scott and Adam. So, guys, thanks for your support, and look for your \$25 check in the mail.

Mike Chesman
President
Bays Mountain Planetarium
Kingsport, TN



IPS Report

John Hare
IPS Representative

If you are planning to attend the 14th biennial IPS conference which will be held next summer in London, England, you need to act quickly to secure conference registration and other necessary arrangements.

Conference hosts are expecting upwards of 500 delegates!

Registration costs for the hotel range from £20 single/ £35



double to £90/ £110. Conference hosts remind everyone that it will be Wimbledon time in London, and therefore rooms and air travel arrangements should be made as soon as possible.

The post confer

ence tour will include visits to the Armagh Planetarium, Dublin and the Dublin Observatory, Newgrange archaeoastronomy site, and the Rosse Telescope at Birr Castle.

For more information or to get a conference registration packet, please contact the IPS 98 conference office at the following address:

The

London Planetarium
Marleybone Road
London NW1 5LR
Phone: 44 (0) 171 487 0310
Fax: 465 0862
E mail: ips98.lonplan@madame
tussauds.com

Cheerio!

President's Message
continued

Conference Call 2000!

One of the greatest benefits of membership in SEPA is getting to attend the annual conference each June. Our group has had an outstanding tradition of meetings that have been both fun and informative. Most recently we've enjoyed some fine hospitality from the beaches of Pensacola, swingin' Nashville, and historic Macon. Of course we depend on our members to provide us with a conference location. It's a chance to show off your facility and community.

SEPA is currently looking for sites to host its year 2000 conference. Executive Council would like to hear from any of you out there who might be considering a conference bid. Please give it some serious consideration. Your colleagues will be most appreciative. Even if you just want some

information on the process, please contact any of us. As always, we're all listed inside the front cover of this issue.

SEPA Web Site

At last year's conference Council announced that it would pursue development of a SEPA Web site. President Elect George Fleenor was chosen to be Council liaison to develop a committee to get the project going. We're pleased to announce the fledgling start to the site, which currently can be found at <<http://kpt1.tricon.net/org/bay-smtn/sepapage/sepah.html>>. It is expected that the site will grow with more pages, some photo galleries of SEPA events, and certainly more links to member facilities. If you have a comment, a suggestion, or a link to be considered, please get in touch with George.

Number One in the World!

Mission to Mars Nets Students \$15,000

Craigmont Planetarium student Interns, Junior Kismet Kerley and 97 graduate Elizabeth Shelly, and Andrew Holbrook, protege of Geoff Holt (James Madison Memorial Planetarium in Madison, WI) won \$15,000 each at the ThinkQuest finals in Washington, D.C., November 21-25.

Their Web site, Mission to Mars, was judged to be the best science and math entry in the international competition. For their efforts, the students won \$15,000 each. Take a look at Mission to Mars at <<http://library.advanced.org/11147>>. Craigmont Planetarium staff Lisa DuFur and Duncan Teague were their coaches.

The invoices I sent out with the final 1997 issue of Southern Skies seem to have had the desired effect. I suppose it's easier to remember to pay your dues if you have a bill in your hands.

I'll remind those who haven't yet paid your dues for '98, your mailing label will say "expired". Please save your Treasurer the loss of a few more of the silver hairs from his head by sending in your check for \$15. Your grace period is about to

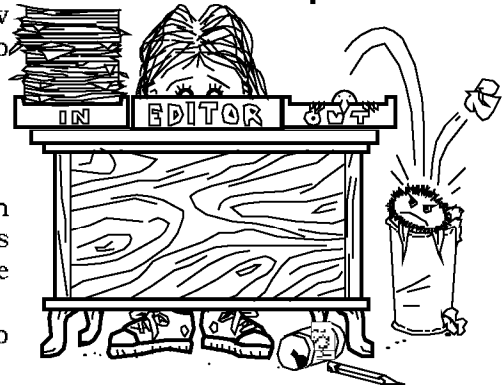
expire.

In this issue you will find a list of slides available for duplication and distribution to SEPA members from two sources. In addition to the STScI images we have received for a couple of years, we now have a relationship with the Jet Propulsion Lab.

We have 66 images from the ongoing Galileo Mission to Jupiter and its moons; one image for the New Millennium Mission, Deep Space 1; two images for the Stardust Mission, and four for the Mars Surveyor '98 Orbiter/Lander. If you would like copies of these images one generation from the originals sent from JPL, see the instructions which accompany the listing.

Please note that I have a new email address, teagued1@ten.nash.tn.k12.tn.us,

Duncan R. Teague
Secretary/Treasurer
Southern Skies Editor
Craigmont Planetarium
Memphis, TN



Mike Cutrera

Send your \$15.00 check made payable to SEPA to the following address:
Craigmont Planetarium, 3333 Covington Pike, Memphis, TN 38128 3902

Name

Planetarium

Organization

Address

City

State

Area

Area

Position

E-mail address

Zip

Voice

Fax

Featured Planetarium: Buehler Planetarium, Davie, FL

Dave Hostetter
Featured Planetarium Ed.
Lafayette Natural History
Museum & Planetarium
Lafayette, LA

Introduction

Buehler Planetarium & Science Center is on Broward Community College's Central Campus in Davie, Florida. The planetarium was built in 1966 through the generosity of aviation pioneer and German

Matinees: \$4.00; \$3.00 seniors
Laser shows: \$6.00

Monthly Specials

Each month the staff of the Buehler Planetarium and Science Center presents an astronomical program that is in more depth than our planetarium shows. Topics include eclipses, comets, exploration of the planets, black holes, galaxies, and many others. Show times are typically the third Thursday of the month at 7:30 p.m., but there are exceptions. Reservations are required. The cost is \$6.00.

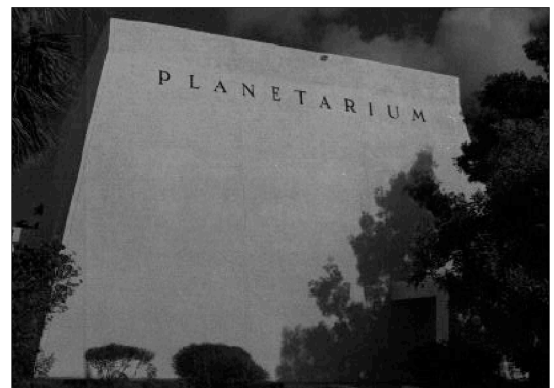
Anneliese Rhein Gillespie Evening Sky Gallery

In addition to our large planetarium theatre, we have a smaller multi media sky theatre with a Goto planetarium projector, a domed ceiling, and an advanced automation system. The 10 minute shows are most interesting and deal with astronomy and space science, related to the current season. Show times are every 20 minutes during regular show hours, on demand at other times. The gallery includes breath taking views of space. Admission is free.

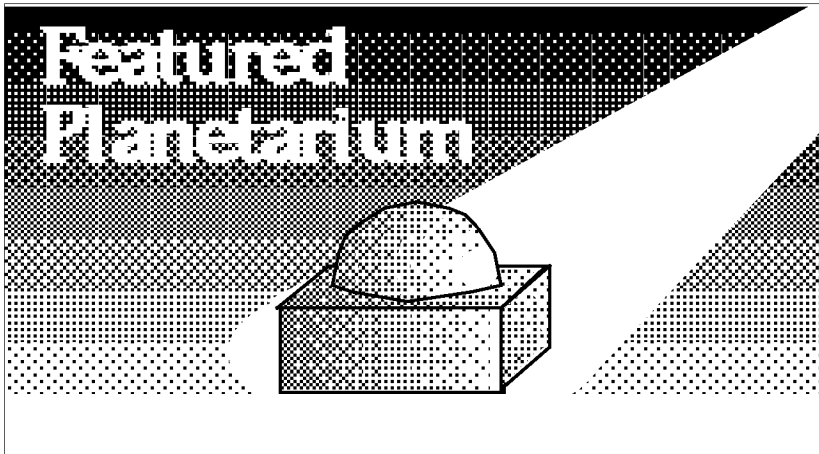
School Shows

School programs for students in grades pre K - 12 are offered weekdays during the school year at 9, 10:15, 11:30, and 12:45. Show topics are selected in coordination with the Broward County School District. Each year a series of seven different shows, designed for specific grade levels, are available for reservation.

Of course we give a great many star



The Buehler Planetarium, Davie, Florida



Mike Cutrera

immigrant Emil Buehler. For over 30 years Buehler has shown astronomy programs to more than 1,000,000 visitors.

As a result of a substantial gift from the Emil Buehler Trust, the facility was completely renovated, and reopened in 1988 with a Zeiss M1015 star projector and a sophisticated computerized automation system.

The Planetarium has a 40 domed star theatre with 101 seats and a second 15 domed star theatre with a Goto Mars II projector. The building has a small lobby, office space, and a public observatory.

Public and Laser Shows

Buehler offers six public star shows and six laser shows a week. Each show lasts about an hour. There is no late seating.

Schedule:

Evening shows: Fri. & Sat., 7 p.m.

Children's shows: Sat. &

Sun., 1:30 p.m.

Matinees: Sat. & Sun., 3 p.m.

Laser shows: Fri. & Sat., 9, 10:30,

12

Admission:

Evening shows: \$5.00

Children's shows: \$4.00;

under 2, free

David H. Menke, Ph. D.
Author
Buehler Planetarium and
Science Center
Broward Community Col-
lege
3501 SW Davie Rd.
Davie, FL 33314
voice 954-475-6681
fax 954-475-2858
Website:
www.educational.net/
resources/buehler
E-mail: a046091

shows to astronomy and physical science classes at Broward Community College. Science Outreach

To meet the needs of younger pupils (pre kindergarten second grade), the Planetarium has a mobile astronomy program that allows us to bring the universe, using portable planetariums, to any school or organization. We have one Apollo portable, and one StarLab portable.

We have in school programs in science for grades three five. These include the Elementary Science Outreach program, After School Science Program, and the Assembly Science Program. There is also a Saturday Science Program that is affiliated with school students.

Planetarium Volunteer Program

Interested and motivated individuals from the community gain valuable experience by working alongside our astronomers and technicians as docents

and volunteers. Observatory

Buehler has a public observatory and a number of other telescopes available for public use. Clear Friday and Saturday evenings telescopes are open for star gazing. Stars, planets, galaxies, and the Moon can be observed. Admission is free with a stub from the planetarium show.

Staff Members (full time)

Planet. Director: David H. Menke, Ph.D., M.S., B.A.; UCLA

Associate Director: Susan J. Barnett, B.S., Yale Univ.

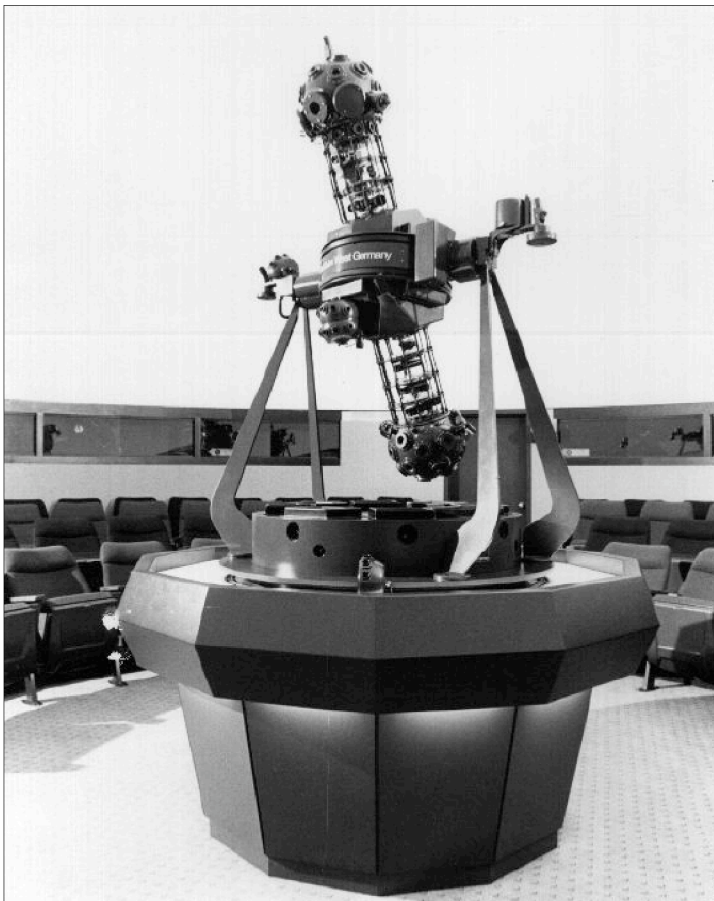
Asst. Dir., Education: J.C. Moritz, B.S., SUNY; M.S., Nova U

Asst. Dir., Programs: James E. Sullivan, A.A., BCC; B.A.; FAU

Asst. Dir., Engineering: Rick G. Lentz, A.S.

Admin. Asst. to Dir.: Sandy Barnard
Intern FY 98: Kristin A. Lester, B.S., MIT;

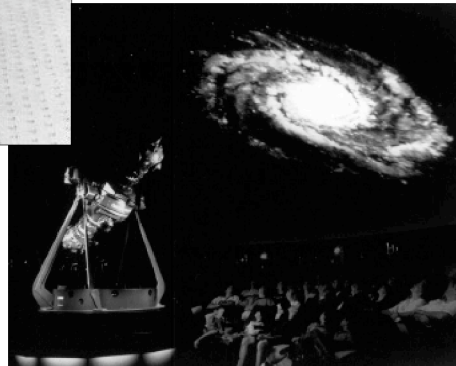
Buehler Planetarium
Davie, Florida
continued



Left: As a result of a substantial gift from the Emil Buehler Trust, the Buehler Planetarium and Science Center was completely renovated, and reopened in 1988 with a Zeiss M1015 star projector and a sophisticated computerized automation system.

The Planetarium has a 40 foot domed star theatre with 101 seats, and a second 15 foot domed star theatre, housing a Goto Mars II projector. The building also has a small lobby, office space, and a public observatory.

Right: Each month the staff of the Buehler Planetarium and Science Center presents an astronomical program that is in more depth than our planetarium shows. Topics include eclipses, comets, exploration of the planets, black holes, galaxies, and many others.



Small Talk

Elizabeth Wasiluk
Small Talk Editor
Berkeley County Plan-
etarium



I had flat Josh visit Berkeley County Planetarium before Thanksgiving. To explain who flat Josh is I must tell the following tale:

Lorrie Shore and the fourth graders of Burke Street Elementary teamed up with a class of fourth graders at an elementary school in the Atlanta, Georgia area to write letters back and forth as sort of pen pals.

One day the school in Georgia did the activity where students lie on large rolls of newsprint and traced around them, making a giant self portrait of themselves. After the large self portraits were completed, a drawing was held and a student named Josh won. Real Josh rolled up flat Josh and stuffed him in an envelope and sent him off to Burke Street School.

Before Thanksgiving Burke Street School booked a planetarium program. They'd been studying about the Moon and wanted to see a program on our Moon.

The program that I do on the Moon involves using the planetarium projector to watch a month's worth of Moons starting with the Moon as it will appear that very evening. This is a speeded up version of watching the Moon go through its phases from Earth. Then I ask the students what causes phases, and I get various answers rarely the correct one. Then I proceed to look at phases from outer space by having students make a model with their heads being Earth, a bright light mounted on the wall as the Sun (one of the few times I use a bright light in the planetarium), and a four inch styrofoam ball mounted on a stick purchased from a company that makes molecular models. The address is:

Molecular Models Co.
116 Swift Street
P. O. Box 250
Edgerton, WI 53534

Anyway, what I do then is have students walk through the month looking at how the phases change on the little Moon ball through the imaginary month. This seems to be a really effective technique because after I am done doing the walk through, most of the visitors can describe to me what

causes the phases of the Moon because they've figured it out themselves.

After we've tackled phases of the Moon, we look at the Moon from Voyager and Galileo pictures and discover that the same side always faces Earth, and from another planet, the Earth-Moon system would appear as a double planet through a telescope, a brilliant blue one and a lovely golden one. Earth's Moon is closer in size to Earth than any other moon in our solar system is to any other planet. [Well... except for Charon and Pluto Ed.]

Then we learn what it is like to be an astronaut and walk on the surface of the Moon. We watch a compilation video of the past Moon walks which includes rides on the little car and learn how and why it is different from cars on Earth. We see the LEM take off from the surface of the Moon to the background music of Jan Hammer.

Then I ask the old feather and hammer question and show an astronaut demonstrating it from the Moon. We also talk about what happened to all those Moon rocks and see results of experiments like laser ranging the distance to the Moon.

Finally we say farewell to the Moon, give the teacher a Moon map for further exploration and play the cool sound track music with the Police and Boy Meets Girl.

Now at this point you may be wondering where flat Josh fits in.

It turns out that when Ms. Shore booked her planetarium program she brought along a camera and flat Josh so she could take a picture of flat Josh with her class and myself and the planetarium projector so she could send it to the class with whom she has pen pals.

After the planetarium program, the fourth grade class from Burke Street Elementary School went back to their classroom and after lunch made a lunar landscape model and a space suit for flat Josh and was planning on sending him to the Moon. During the planetarium program flat Josh had his own seat.

Do you have any visiting groups that have incorporated a planetarium visit into

Astro-Video Review

From Here to Infinity: the Ultimate Voyage

I recently viewed the video *From Here to Infinity: the Ultimate Voyage*, put out by Paramount Pictures. The video overall was very good and provided a wide range of information not generally discussed.

The first thing that catches a listener's ear in the feature presentation is the well known narrator, Patrick Stewart. Little as it may seem, the narrator is a vital part to this film. It was a well thought out idea to have someone recognizable. It was an added plus to the video. Stewart begins by talking about the three universes in which we are involved: the micro, everyday, and macro universes. Next pre credits roll with really nice pictures behind them. This is nice because it allows the viewer to see something besides the credits.

The next thing the viewer sees is a futuristic space station in computer graphics. A launch of a ship is occurring. Later in the video it is briefly mentioned that this is our ship we will use to explore space. This segment introduces the only consistently negative feature of the video jumping from one idea or area to another without any lead in or explanation.

A heading introduces each new segment of the video. The first heading is *The Outer Planets*. Apparently we are going to look outward, beyond our solar system.

The first planet described is Mars. The visuals of the red planet Mars are yellow computer graphics. Despite the poor graphics of Mars, the information was good. It pointed out the major surface features of the planet and does not dwell on pointless information.

The next planet discussed is Jupiter. This part of the video is a flop. The pictures are computer graphics that show the planet fairly well. The video explains about how comets are rerouted due to the heavy gravitational pull of this planet. This is interesting. Next, however, was the most obvious physical characteristic of Jupiter, the Great Red Spot.

Next we go to Saturn, where its rings are discussed. Information was basic. The next planet, Uranus, was not a good location for flybys, and so it was completely skipped! Neptune is the next planet. Again sufficient, basic information was given.

The next heading is *Pluto and its moon Charon*. It seemed pointless to have a separate heading for Pluto.

The planet sections were good overall. They provided a simple introduction to our trip into deep space. Most of the planets were shown in computer graphics that gave a good look at each planet, and the program improved as we traveled farther.

The rest of the video dealt with much more complex ideas about the Oort comet cloud, black holes, stars and their lives, the wall of galaxies, and other less well known topics. It too was broken into different sections with headings.

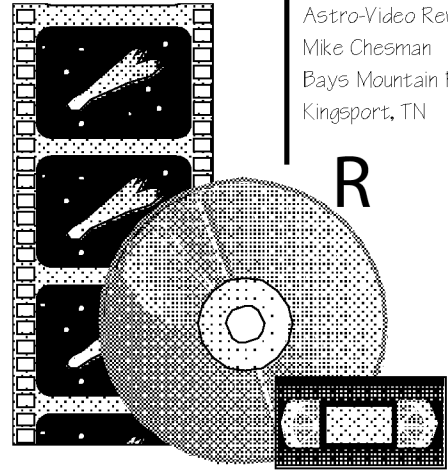
The most amazing thing I noticed about the video was the sense of awe one is left with at the end. The video does not go deep into hard to understand ideas, but instead it shows the vastness and complexity of the universe.

Pictures of stars, galaxies of different types, and other huge astronomical bodies like the wall of galaxies were very interesting. Complex ideas like black holes were not explained in intense scientific explanations so viewers can understand and not be discouraged by elaborate ideas about space. The video went through all these ideas in an orderly, natural fashion.

On a scale of 1-10, this video is an 8. The biggest problems were lack of clarity in a few areas and scarcity of planet information. The video would benefit if the first section was removed or fixed.

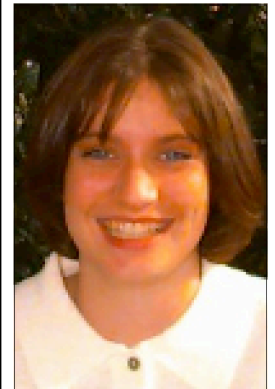
The pictures at the end were incredible. They show the beauty of the stars, galaxies, and our universe. The best part of the video was how it presented complex ideas, and astronomical hugeness of our universe in lay terms.

From Here to Infinity: the Ultimate Voyage came from the National Air and Space Museum in Washington, D.C. Priced at \$14.95, it seems like a good souvenir.



Astro-Video Review Editor
Mike Chesman
Bays Mountain Planetarium
Kingsport, TN

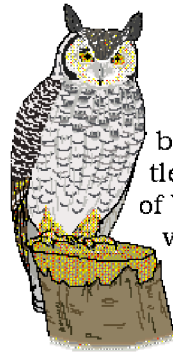
Author
Elizabeth Spilman
Junior Intern
Craigmont Planetarium
Memphis, TN



Her Own Space:

An Interview with a Planetarium Director

Barbara Reynolds
The Night Owl
Settlemyre Planetarium
Rock Hill, SC



Small Dome Survival in a Big Dome World

Glenn Dantzler and I have been associated with the Settlemyre Planetarium, Museum of York County, as staff and as volunteers for many years. Our staff consists of three people: Glenn, who works full time as Planetarium Director, instructor, and production/technical manager; the author, who works 30 hours per week as an instructor mainly for school groups and summer camps, as production assistant, and hopefully as creative side kick; and Sam Belk, weekend planetarium assistant and computer programmer.

Between the three of us, we have over 60 years experience as amateur astronomers. We re all active in a local astronomy club, The Carolina Skygazers. Glenn was one of the founders of the club in 1985-86. In addition to sharing our telescopes with the club, we also do programs (both outreach and in the planetarium) on request for scout groups attempting to complete their astronomy badge requirements.

Barbara: Thanks for taking time to meet with me and let me pick your brains. If you could address people in the planetarium profession about anything, as we approach the 21st century, what would that be? Give me a topic, Glenn.

Glenn: I'd like to talk about small dome survival in a big dome world. The first thing to do to survive, is to integrate the Planetarium into the school system, to make the planetarium an integral part of as many school districts science curricula as possible. It's best to invite curriculum coordinators and science teachers to your facility or to conduct workshops so that they can see the resources you can offer. Many of these people, however, cannot take the time to visit you, so, you go to them! This curriculum integration is most easily accomplished from 1st-5th grade, but this doesn't mean you cannot integrate 6th grade and above. The problem we ve

noted is that junior high and high school programs involve changing of classes and teachers.

Barbara: Example?

Glenn: In the 8th grade right now there are so many changing classes it is possible to work

with teachers from different disciplines to free up students to spend time at your facility and make up missed classes on other days. This has proved extraordinarily successful in our area, with visitation approaching the 19,000 figure for the school year September through May. Secondly, sponsoring an Astronomy Club allows for an enormous amount of outreach within your local area in the form of volunteers for star parties. This tends to interest students and teachers.

Barbara: Because it's more interactive?

Glenn: Yes, they are looking through telescopes which leads to additional visitation, for instance, whole families might return on weekends to the planetarium. My third point would be that you have to modernize to the best of your budget's ability. With the advent of video games, the Internet, and other sources of instant gratification, students are not, nor do I believe are teachers, willing to be exposed only to a lecture style planetarium program.

Barbara: Could you elaborate?

Glenn: You must have variety, as some classes come specifically for live sky and constellation study, while others come for a combination of entertainment and education. This is why we offer, here at the Settlemyre Planetarium, ten school programs for various ages and various subjects. This variety requires multiple projection systems. Dissolving pairs and cross fading pairs are the minimum. In addition, at the very least, one video projection system to add interest and



(continued on page 25)

Book Review: The Demon-Haunted World

I enjoy having conversations like the one I had a few weeks ago. During a staff meeting my assistant Jeff asks, Am I remembering correctly that you are the book review editor for the SEPA journal? Yes, I reply. Oh good, says Jeff, Umm... do you ever take unsolicited reviews for astronomy books? Yes, I reply. Oh good, says Jeff.

Would you mind if I write a review for the book I am currently reading? No, I reply. Several days later a review for the book appears. I most enjoyed the fact that on my list of things to discuss at the meeting was the following item: (8) ask staff if anyone would be willing to write a review of any books they are reading or just finished reading for the SEPA journal. That turn of events doesn't happen nearly often enough. The ironic part is that I recently bought this book and have not gotten too far into it. Judging from what Jeff thinks, I should pick it up and finish reading it.

I have often wondered how today's society would be viewed by an observer in the distant future. When I first posed that question to myself, I came up with answers such as great advances in medical science, the first space flight, and the unleashing of the atom. Over the last few years, though, I started to look around and see things like 1900 psychic numbers, the Harmonic Convergence and other planetary alignments, and alien abductions. I began to wonder if we would be perceived any differently from the superstitious peasants of the Middle Ages.

Since I have started working in the planetarium community, I have spent much more time thinking about such things. We've all had our encounters with the public and their misconceptions and misunderstandings about science. Sadly, many of us are now more surprised by the person who is well informed and curious, rather than misinformed and afraid.

In *The Demon Haunted World*, Carl Sagan takes a long, hard look at both our present and past understanding of science and the world around us. The overall picture he draws is not pretty. Even in this age of rapid scientific advancement and communication, we as a whole still

continue to be a superstitious, ignorant conglomeration of people.

The main functions of Sagan's book are to define science and to show how its methods and principles are invaluable tools in all aspects of life. This he does very well. A secondary function of the book is to debunk much of the pseudo science that is prevalent in the world today. This he does even better.

Sagan explores the phenomena of alien abduction in great detail, without wallowing in too much minutia. Like any good scientist must, he appears to approach the topic with an open mind. He lays out many arguments and evidence put forth by the believers of these abductions, as well as the counter arguments. Rather than just dismissing the claims, he tries to discover the truth. His conclusions are very lucid, even if they are what you would expect.

Along the way, we discover an almost frighteningly close parallel between the belief in aliens today and the belief in incubi and witches of yesteryear. One begins to question whether we have advanced at all.

Overall, the book was a joy to read. I must say I was surprised at how easy it was to get through, and how much of it stayed with me after I was done reading it. I have only two complaints about the book. First, in many parts it feels like a set of shorter essays strung together, sometimes seeming to shift from one topic to another. Second, many of the chapter titles are rather vague. It's hard to go back and locate a specific part for review.

Even so, *The Demon Haunted World* is one of the best non-fiction books I have ever read. After completing it, I felt inspired and invigorated in my work as a planetarian. I wholeheartedly recommend this book to anyone, especially those in the science education field.

Patrick McQuillen
Book Review Editor
Alexander Brest Planetarium



*The Demon-Haunted World:
Science as a Candle in the
Dark*

Written by Carl Sagan

Copyright 1996
Ballantine
434 Pages, \$14.00
ISBN 0-345-4096-9

Reviewed by
Jeff Potter
Planetarium Lecturer
Alexander Brest Planetarium

News from SEPA States

George Fleenor
Bishop Planetarium
Bradenton, FL

Bishop Planetarium, Bradenton

The Bishop Planetarium is currently running Through The Eyes Of Hubble as the featured star show twice daily, seven days a week. The show is also presented every Friday and Saturday evening as part of the Skies Over South Florida program which includes a live tour of the current evening sky. The evening star show is followed by an observing session in the observatory, weather permitting.

The Saturday morning children's program currently features Rusty Rocket's Last Blast, Larry Cat in Space, and Snooty's Great Space Adventure, a popular program featuring our resident manatee. In addition, the planetarium is swamped each morning with educational programs for visiting school children. Visiting classes can choose from more than 40 different educational programs that can be run within 5 minutes of selection.

Matinee laser shows (2:30 p.m. daily) feature Big Band Boogie during January-February, Cosmic Classics, a salute to classical music, is planned for March-April. Evening laser shows continue to feature classic Rock & Roll in addition to more current popular groups and styles such as Techno. The laser production bench is now 100% ILDA compatible. We have several new shows to offer those facilities interested in purchasing or swapping laser shows (ILDA format of course).

On another note, the observatory is nearing completion. Dedication of the new telescope should occur on the evening of February 3rd. On this night, Jack Newton is scheduled to give a lecture on astrophotography which will be followed by the dedication of the new telescope and a reception. The new telescope, to be known as the Cohen/Sabin telescope, will rest on a new Wojcuk II German Equatorial mount. The new mount has 5 shafts and uses 7 Byers gears on its R.A. and δ axis and a MotoTrak V drive corrector. A 8" doublet (Brandt) refractor is the primary telescope to reside on the new mount and will be combined with the former 6" f12 Astrophysics A.P.O. and a 6" f6 newtonian. The telescopes will continue to be used with general public observing sessions, as well

as, H α , CCD and real time video imaging. The observatory also received a new observation deck, complete with isolated observing platforms, aluminum stair case and railing. A special partial solar eclipse party is planned for February 26th, highlighting the new facility. The sponsor for the event will be a local magazine known as Eclipse. The celebration will continue into the weekend laser show presentations of Pink Floyd's, Darkside Of The Moon and The Wall - one of our Think Pink! weekends.

Alexander Brest Planetarium, Jacksonville

Patrick McQuillen reports the Alexander Brest Planetarium staff have been very busy installing planetarium programs. With the short holiday show run times, it seems like we are installing a new program every week. We finished our holiday run with the 9th annual showing of Star of Wonder. This program is always well received.

Winter programs include Sandy, Pepper and the Eclipse; Cosmic Catastrophes; Follow the Drinking Gourd; and Sky Tonight. Sandy, Pepper and the Eclipse is the children's program produced by Bowen Productions. We are running it for a second time this year to help get information out about the solar eclipse in February. [I plan on being on a beach in Aruba that week!]

George Fleenor]

Cosmic Catastrophes is an in house production that talks about everything that goes bump in the night. This of course includes the Shoemaker Levy 9/ Jupiter collision, Tunguska, Meteor Crater, Peekskill New York, etc. We even blow up the audience at the end of the show when a large meteor strikes the Earth! (How many times have you wanted to do that?) Follow the Drinking Gourd will run during Black History Month. Finally, Sky Tonight is the standard live sky tour of the current night sky.

The Planetarium offered a one day public trip to the Kennedy Space Center to view exhibits, an IMAX film, and the launch of the Space Shuttle Columbia on STS 88. It was a very successful trip, the highlight

being the on time launch of Columbia on a day that had only a 60% chance of launch because of clouds. The clouds cleared just minutes before launch time. It was very rewarding to have folks on the trip thank me for setting up the launch. Almost like they thought I told NASA to launch the Shuttle that day. We will probably do this trip again. Orlando Science Center The Dr. Phillips CineDome just opened the original show StarQuest. This show looks at constellations, stars, black holes, planets, and the planetarium star theatre. The Digistar portion of the show will be available from the DUG library in a few months. Anyone in the Orlando area wanting to stop by is encouraged to call so that we can arrange for seating.

Observatory attendance remains high with an average of about 100 people per hour. With our 10 refractor we have been able to spot 4 of Saturn's moons even with the glow of downtown Orlando. We are in the process of gearing up for the solar eclipse in February. It is hoped that we can make the video images available to our local schools through the county's video link ups.

Indian River Community College

William Emmanuel Bell was born on December 4, 1997. He weighed 10

pounds, 7 ounces, and was 22 inches long (almost big enough to drive himself home from the hospital!) Parents Jon and Lisa Bell are very proud and happy, while 2 year old son Danny is excited and surprised and not quite sure what to make of the new bah bee. Jon predicts both will become outstanding astronomers when they grow up.

Star of Wonder has now played for five straight years in the Hallstrom Planetarium since its opening; record attendance resulted in every show being sold out, and the program was very well received.

Buehler Planetarium, Davie

Dave Menke reports: We've been running Star of Wonder along with The Little Star that Could. In January we will run More than Meets the Eye and switch Little Star with In My Back Yard. Our December special, The SOB (Dave Menke's Christmas show), which runs one night only, had 2 sellout shows. The January special is about the Crab Nebula called Explosions in Space. We are currently building a new laser light system. We are also renovating and refurbishing our 101 seats after 10 years. Our former Assistant Director, Sharon Parker, was promoted to an administrative post in the College. Former producer Susan Barnett replaced

George Fleenor
Bishop Planetarium
Bradenton, FL

Morehead Planetarium is ringing in the new year with exciting activities. Two new star show openings, a guest lecture, and PlanetWatch 98 are all in the works.

One show, U.F.O., investigates Unidentified Flying Object sightings and explores scientific efforts to contact extraterrestrial beings. The Sudukem's Rusty Rocket's Last Blast, will carry children throughout the solar system as this delightful show is added to the winter offerings at the Morehead.

Dr. Donald Goldsmith, author of such noted works as, The Search for Life in the Universe, The Search for Extrasolar Planets, and The Ultimate Einstein, will speak in January on The Hunt for Life on Mars. His presentation will lend perspective to goals of Pathfinder and earlier Viking missions to Mars.

Planetarium director, Dr. Lee Shapiro will be the host for PlanetWatch 98, a live look at planet watching opportunities and celestial happenings in 1998. In addition, the Morehead has a busy schedule of

regular programming including, Mysterious Solar System, Sky Rambles, and Sol and Company.

Schiele Museum Planetarium, Gastonia

On November 10th, Jim Craig, formerly of Oregon, became the planetarium director at the Schiele Museum. He has spent the hectic holiday season trying to settle into a new job and a new part of the country. Through the Internet, he is somewhat acquainted with a few SEPA folks, but he looks forward to becoming a member, learning to know many more of us, and possibly attending the conference in Roanoke this summer.

The Schiele is looking forward to docking NASA's mock up of the International Space Station during the month of January. This traveling hands on exhibit is contained in two 48 trailers and features mock ups of actual onboard experiments to be conducted in orbit. Living quarters show where the crew of six astronauts will

Richard McColman
Morehead Planetarium
Chapel Hill, NC

Richard McColman
Morehead Planetarium
Chapel Hill, NC

sleep, exercise, relax, and prepare food. Visitors will be able to step into the astronauts shower and bathroom compartments as well as zip up in an astronaut's sleep restraint unit.

Young people can attend the Saturday morning feature, PlanetQuest, which offers an entertaining story line, exciting visuals and up to date planet information. Also showing during the winter months, Destination Universe and Sky Over Gastonia.

Woodson Planetarium, Salisbury, NC

School groups visiting the Woodson Planetarium during the winter months will see several original programs designed to enhance their curriculum. Kindergarteners will be introduced to the planetarium and to the night sky by experiencing, Backyard Stars. Second graders will use the planets

and laserdisc images to sharpen science process skills and practice the scientific method in a program called Space Detectives. Third grade visitors will learn of Native American legends in Daughter of the Stars, a program which is paired with a program called Indians and the Earth. Finally, first grade students will get an opportunity to use the planetarium to study Day and Night.

A stargazing event for families was held in conjunction with the Salisbury Parks and Recreation Department. Although rain and cloudy skies dampened some spirits, a few hardy souls were patient enough for quick looks at a few of the planets when the clouds parted briefly. Interest was generated with this first attempt to make plans for subsequent outings throughout the year.

Gibbes Planetarium, Columbia

Here in Columbia we've been splitting our attention between the current theater and the new planetarium project at the S.C. State Museum. In the current theater we've continued with our normal array of school programs, adding Sudekum's Our Place in Space to the lineup. We've also been running Season of Light as a holiday program and opened Light Years from Andromeda as a public show in January. Plans for the coming months include a solar eclipse watch, girl scout camps and other activities.

The new planetarium project has received a minor setback which has caused a 1 year delay in the design phase. This puts opening of the new theater (a planned 50 facility with an attached observatory) back at least 4 years. Although we are disappointed by this delay, we hope to run programs in a classroom and Starlab setting in the interim. [The current theater is scheduled to close in June 1998.] Cross your fingers for us.

Dupont Planetarium, Aiken

Gary Senn reports that the Dupont Planetarium has been running Buhl's Journey into the Living Cell which has been well received by middle and high school groups this Fall. Many of the teachers commented on how they never had anything like that when they took biology. During the Christmas season the annual show Tis the Season was also well received by audiences. In the remaining

winter months of 1998 we present The Voyager Encounters, and spring sees a return of the cell show and Through the Eyes of Hubble.

Settlemyre Planetarium, Rock Hill

Several programs are planned for winter and spring. Two versions of Through the Eyes of Hubble are running concurrently. The full length program is showing as a weekend public show, but the program is also available in a special shortened version for 5th grade students that allows a question and answer session. February will feature Following the Drinking Gourd and a new children's program on exploring the solar system. Also in April, a new program on sky bears will open tying in with a year long exhibit on bears at their museum.

The staff is continuing to have success with integrating their programming with area schools. Meetings with area science teachers are planned to help better match programs with the teachers' curriculum needs. Also coming up is the Gathering at the Equinox, an astronomy fair and star party very popular in past years.

Hooper Planetarium, Greenville

One big piece of news from Greenville is that Steve Morgan, formerly from the Schiele Planetarium, has joined the staff as their new astronomy educator. He reports that he is settling in nicely, although is still making a long commute from Gastonia as his wife searches for a teaching position

Todd Slisher
Gibbes Planetarium
Columbia, SC

in Greenville.

In the planetarium a large variety of school shows are currently available as well as several public programs on Friday nights. Some of these include Rusty Rocket's Last Blast, a live sky program,

that complements their observing sessions, and Edge of the Universe, a special Digistar demo set to music. Also coming up in February is the updated version of Loch Ness The Mars Show. Work also continues on the installation on an all sky system

News from SEPA States
continued

Todd Slisher
Gibbes Planetarium
Columbia, SC

Bays Mountain Planetarium, Kingsport

Bays Mountain Planetarium reports great success with the Destination Mars future exploration program distributed by Spitz. With editing we were able to add a prologue covering Mars exploration through the Pathfinder Mission, including lots of images from that mission. This winter Ash Enterprises will overhaul our Goto star projector that will include some East Coast Control automation interfacing.

Sudekum Planetarium, Nashville

The Sudekum Planetarium presented *Is There Life On Mars?* produced by the Adler Planetarium in Chicago in November and December to very enthusiastic audiences. Our enthusiasm for a program tends to wane, however, after the tenth time. So, we amused ourselves by altering the title in the logbook to *Is There Life _____?* and filled in the blank.

Sharon Mendonsa, Astronomy Educator who has been in Nashville for more than six years, completed her annual Sky Calendar and is arranging for its distribution to all Davidson County teachers as well as many of the surrounding school systems. It may be only thirteen pages, but it represents a monumental amount of work.

Meanwhile, Waylena McCully, the other Astronomy Educator, spent her time preparing, installing, and programming two shows which opened in early January. They are *Sandy, Pepper, and the Eclipse* from Bowen Productions in Indianapolis and *Seeing the Invisible Universe* from Adler in Chicago.

Mayra McCloud, Planetarium Artist, has been working on elements for *Worlds In Motion* on her new Mac workstation. Robert Rodriguez, Technician, has been installing computer components and setting up printer sharing for the Planetarium offices. He is also modifying all of our East Coast Controls slide projector controllers to incorporate hardware improvements that work better with our aging Elmo slide projectors. The control boxes are called castors, so we refer to this process as castoration.

Craigmont Planetarium, Memphis

We experienced quite a thrill last Thanksgiving when our astronomy students international ThinkQuest contest entry, *Mission to Mars*, was judged first place. Our Interns Kismet Kerley and Elizabeth Shelly and partner Andrew Holbrook of Madison, Wisconsin each received \$15,000 scholarships for their efforts. Take a look at *Mission to Mars* at <<http://library.advanced.org/11147>>.

We continue to pursue a grant for a satellite dish. We have massaged our proposal so many times for so many different funding sources, we are tired of the process.

We continue to run Sudekum's *Our Place in Space* for Kindergarten and first grade students, Hansen's *The Secret of the Cardboard Rocket* for second and third grade, and GLPA's *Solar System Adventure* for fourth through sixth grade.

In April we will do a series of lessons for a systemwide mathematics program called *PaceSetters*. They will see our student produced star show *Hubble: From Here to Eternity* and perform a math activity using the star theatre's coordinates, recently painstakingly re-aligned by a Spitz technician during our annual maintenance service. We will ask the high school students to graph the noontime altitude of the Sun for a year. From this activity, they can deduce that the Earth's orbit around the Sun is not a perfect circle and when it moves faster and slower around the Sun. It will also correlate well with a classroom activity *PaceSetters* students have already done on the number of hours of daylight we receive at different times of the year.

Lisa DuFur is head coach of a team of two Interns and a German student working on a ThinkQuest entry on *Women in Science*. Duncan Teague is coaching two Interns on another ThinkQuest project about the International Space Station. A *New Star on the Horizon* is the working title for this entry. Our colleagues at the Sharpe Planetarium have offered to showcase the ISS site at the Pink Palace Museum. (Thanks Kathy, Roy, Anthony, Ed, Alice, and Web Site Coordinator Andrew!)

Duncan Teague
Craigmont Planetarium
Memphis, TN

Dave Maness
Peninsula Planetarium
Newport News, VA

Science Museum of Western Virginia Hopkins Planetarium, Roanoke

Gary Close reports that the winter programs are in full swing. A locally produced program called Jewels of the Night is running through the Vernal equinox. Also, in January a children's show called Backyard Critters will be featured. He described the program as the adventure of several animal characters including a praying mantis, ants, a beetle, and a dragon fly. They learn about the night sky while searching for a rumored spilled bag of dog food. This will be followed in February by Follow the Drinking Gourd.

He is looking forward to some renovations in late winter or early spring. With the help of Sky Skan and East Coast Control Systems he will be replacing the old Spitz automation with ECCS and multimedia automation will be accomplished with the Sky Skan Spice system. Gary is looking to hire a new staff member. He has a position for a Planetarium/Starlab Educator. Call him for more information.

Lastly, plans are continuing for what should prove to be one of the most productive and enjoyable SEPA conferences. It will be held at his place in Roanoke this June.

Virginia Living Museum Peninsula Planetarium, Newport News

This winter we are bringing in an exhibit of space art by Joe Tucciarone called Visions of the Universe. We plan to supplement the exhibit with artifacts such

as ancient navigation devices, models of futuristic space ships, and antique books. The exhibit runs from the end of January through the end of May.

In the planetarium we will be running a shortened version of The Seven Wonders of the Universe. This is a classic production of the old New York Hayden Planetarium, narrated by the late Burt Lancaster. We are still on the lookout for a good program to offer for the spring.

Laser shows return in January as well. We have a slate of new programs that we hope will bring in a whole new audience. The play bill includes Laser Beatles and Metallica as well as the perennial Pink Floyd's Dark Side of the Moon.

Science Museum of Virginia Ethyl Universe Planetarium, Richmond

Eric says that January is maintenance month for the Universe. Still they are running a live current evening sky star show. In February they will be showing Jeff Bowen's Lifestyles of the Stars. That will run through Labor Day when they plan to close for five months. During that period some major renovations will take place. The dome which has warped with age and humidity will be replaced. They will also be installing new seats and carpeting. A local contractor is doing the work.

As for Omnimax Dome movies, the feature film is Alaska. This one runs into April, and then Everest opens on April 4 and runs through Labor Day at which time they will close for renovations.

Parkersburg and Hedgesville

Larry Brown of the Dwight O. Connor Planetarium at Parkersburg High School is gloating that Parkersburg halted the advance of Hedgesville High School in the football state championships. Hedgesville High School is where Berkeley County Planetarium is located. Ever since Larry Brown and Elizabeth Wasiluk attended S.P.I.C.A. (Support Program for Instructional Competency in Astronomy) together at The Center For Astrophysics at Harvard University, where they watched the ill fated Spartan Solar Observatory get tested, they have had an undeclared football rivalry each time the two teams find themselves in competition.

Larry Brown survived having to return to teach three classes of Biology and run the planetarium after years of just be

ing planetarium director and teaching astronomy.

Former Berkeley County Planetarium assistant, Frank Aliveto, made his first appearance as a West Virginia Mountaineer during the recent Temple West Virginia football game.

WASHINGTON, DC

Friend of SEPA Rob Landis, now of the Goddard Space Center in Greenbelt, MD talked about the Russian space program dare I say one of his favorite topics at the monthly sky lectures at the Air & Space Museum's Einstein Planetarium. Rob's establishing himself as a guest speaker. Besides his talks for planetarium groups, Rod Martin of the Washington County Planetarium in Hagerstown, MD had him speak at his son's Eagle Scout dinner.

Elizabeth Wasiluk
Berkeley Co. Planetarium
Hedgesville, WV

SEPA Code of Ethics

Commitment to Patrons

The professional planetarian knows that his/ her position exists because people have a need to be served. In serving the needs of people to understand our universe, the planetarian understands that he/ she is seen as an expert and responds by maintaining the highest standards of integrity.

In fulfillment of the commitment to patrons, the planetarian:

- promotes and extends public knowledge of, and appreciation for astronomy, science, the scientific process, and the planetarium profession;
- shall not on the grounds of race, color, creed, sex, or national origin exclude any patron from participation in or deny him/ her benefits under any program, nor grant him/ her any discriminatory consideration or advantage;
- shall not promote subjects and opinions not grounded upon scientific principles;
- shall make every reasonable effort to protect patrons from conditions harmful to learning or to health and safety;
- shall respect the rights, beliefs, and sensitivities of the patrons;
- shall not misrepresent an institution or organization with which he/ she is affiliated, and shall take adequate precautions to distinguish between his/ her personal and institutional or organizational views;
- shall seek opportunities to be of constructive service in civic affairs and work for the advancement of the safety, health, and well being of the community.

Commitment to the Profession

No planetarian can perform his/ her duties in a professional way without interacting with others in the profession. This interaction with other planetarians nurtures both the professional and the profession, providing new developments and techniques. The professional planetarian recognizes the value of working with

the professional organizations and deals equitably with others in the profession.

In fulfillment of the commitment to the profession, the planetarian:

- continues professional development throughout his/ her career;
- should strive to increase knowledge within the profession and share developments with colleagues;
- shall accord just and equitable treatment to all members of the profession;
- shall admit and accept his/ her own errors when proven wrong and refrain from distorting or altering the facts in an attempt to justify his/ her position;
- avoids any act tending to promote his/ her own interest at the expense of the dignity and integrity of the profession;
- shall not misrepresent his/ her personal qualifications;
- shall not knowingly distort evaluations of colleagues;
- shall withhold and safeguard information acquired about colleagues in the course of employment, unless disclosure serves professional purposes;
- shall not refuse to participate in a professional inquiry when requested by an appropriate professional association;
- shall not use coercive means or promise special treatment in order to influence professional decisions of colleagues;
- shall give credit due to others for work, contributions, discoveries, or creations;
- respects the rights of other artisans and professionals to collect just compensation for the fruits of their labors;
- should actively support and participate in activities and programs of professional organizations;
- should establish harmonious relations with other colleagues and

(continued on page 26)

Astronomy on the Internet

by Dave Maness
and Kenneth Moore
Peninsula Planetarium
Newport News, VA

presented as a paper ses-
sion at the 1997 SEPA
conference in Pensacola, FL

As many of you do, we often plan special events around big astronomical events such as solar eclipses, lunar eclipses, and of course comets. This past year was loaded. We did special events for all of them, including two comets and two lunar eclipses. These events can be fun, educational, and bring in extra cash, which makes our administrators very happy. But as you spend hours planning for these astronomical happenings there is a thought in the back of everyone's mind... What happens if it rains? What do you do?

A few times in the past we have gotten the cooperation of local TV stations, and other science museums. On at least one occasion the TV station sent out a satellite uplink unit. This is a truck with an extendable tower with a dish antenna mounted on the roof. This allowed us to link up with several other observation sites by way of this satellite network. It increased the chance that all our work of setting up the event would not be wasted in case of foul weather. We would at least be able to view something on a TV monitor.

Before the first lunar eclipse of on April 3, 1996 I got a call from Robin Symonds of the Seymour Planetarium in Springfield, MA asking if we would like to do the same thing again. I decided to look into it. That eclipse was one that began before moonrise for our location. So I looked on the map and found a planetarium in Kensington, Prince Edward Island, Canada. I asked the Director, Bart Bourne to see if he could get a local TV station to set up the equipment. By the way, that is a needy private Spitz Planetarium. If you have any extra or used parts, they can use them. That's when we found out that TV stations were not as cooperative as they once were. They now wanted to charge us several thousand dollars to set up the equipment. Needless to say, none of us had that money in our budgets.

I did have an untried back up plan. Plan B involved the Internet. The World Wide Web by definition links to the world. It only costs your monthly fee and that depends on your server. What I wanted to do was to post successive images of the eclipse on a home page as it was actually

happening.

First, I called AOL for help. I pitched it as a great way to advertise their service and provide a new and interesting addition. They said to call their Web page creators who would be glad to make up a page for a fee. We had no money to devote to the project so once again we were on our own.

Then I remembered hearing about digitizers, digital cameras, and a thing called Snappy which digitizes video input. It was a good excuse to buy a video camera that I wanted anyway. So I bought one along with a Snappy device for about \$180.

Time was running out, as it was nearing the date of the eclipse. We had planned multiple activities, rain or shine, but we were naturally hoping for the latter. The weather forecasts though, gave us a big question mark for the event.

I asked my Assistant Ken Moore to find out what he could from his friends at his local Web service Visionary Systems of Newport News, VA. This is a local Internet Service Provider or ISP for short. They liked the idea and helped us put together an eclipse home page just a day or so before the eclipse. In a test run, Ken found that uploading images had limitations; mainly modem speed. At that time the fastest common modem speed was 28.8. This could send data at an average rate of 2.8K per second. For an average sized photo we were talking about 4 minutes per image. This was not acceptable for live eclipse images. We wanted fast access to the net to be able to send the images as they came through the CCD or video camera. Ken again called his friends at Visionary Systems and got some ideas on how to proceed. Miguel Patting, Technical Director at Visionary Systems, concluded that we needed to set up the camera at his office where we could link directly into the Internet. Uploading would then take a matter of only 3 seconds. So the time needed to post two successive pictures went from 8 minutes to just over 6 seconds. Things were a bit easier after that, since the time barrier was overcome.

To integrate the digitizer to the ISP computer was easy since they operated

off of Windows 95. The Snappy device and software were installed while the network program operated in the background. For the lunar eclipse of September 26, we chose to capture 1 image every 5 minutes during first and third contacts and 1 every 10 minutes during totality. These times were mentioned on our home page so visitors would know when to reload the page to get the new image. Those who visited through Netscape had the page reloaded automatically. We had the ability to post more images at a rate of about 1 in 10 seconds, but as you know from past lunar eclipses not much change is noticed in a space of 5 minutes. A picture every 10 seconds would be plenty fast enough for most phases of a solar eclipse, however.

Fortunately, the weather cleared and our event went forward as planned. Since I was doing eclipse interpretation, showing lunar soil samples, meteors, and tektites at the museum, Ken took the equipment and set it up over at Visionary Systems. There he captured about 35 pictures of the eclipse and posted them on our page in succession.

After the eclipse was over, we decided to do a best of the eclipse page. Visinet agreed to allow us to use their computer for another week. We compiled the best images and placed them together on our page. Even after the eclipse the page was fairly popular as we checked the visitor count periodically.

In conclusion it was worth the effort and we will likely do it again. It worked very well and was surprisingly easy to do. The quality of the images however, left much to be desired. A better camera would have helped. We needed to plan better and set up the home page long ahead of time. We looked at it as an experiment. We had never heard of anyone doing this before, so we had to make things up as we went along. We didn't even know if the weather would cooperate until the day of the event. Since we didn't know how it would work out, we didn't make a big deal about it to the press. On the day of the eclipse we contacted a few friends and planetarians we thought might be interested. Still, with such little advertising we counted approximately 250 people who visited the site, and from as far away as New Zealand and Hawaii.

In the future, if we had several museums set up in the same way, chances are good that at least one of them should be able to provide the eclipse to any other site

which might be clouded over. This could work just as well for comets, occultations, or any other event as long as the equipment has the required sensitivity. With this we would have another way to bring astronomy to everyone in the world, or at least those with access to the Internet. Our advice is to plan ahead and create the home page long ahead of time. As Stuart Goldman suggested in his Sky and Telescope article of February 97, get the word out and make links to related sites. Good luck and clear skies.

What you need:

- Computer (486 66MHZ or better) Pentium preferred
- Low light Video Camera with at least 12X Zoom or CCD camera with composite signal out
- Snappy or other digitizer equipment
- Digital still cameras
Planetview Digital Camera Kit (needs monitor)
Kodak DC 20 (takes only 16 photos at a time)
Casio QV Digital Camera (takes up to 192 images, cost-\$600)
- Webcams (They may not work for astronomy, they may be permanently set for focus and size. I have never used one.)
- Telescope with appropriate adapters for the imaging equipment you choose (depends on the type of event and magnitude requirements)
- A local Internet Service Provider (ISP): we used Visionary Systems in Newport News, VA

Procedure:

- Create the frame for the HTML page.
- Have a preset name for the image.
- Preload the Snappy or other digitizing software.
- Connect the digitizer to the video source
- Start up the Network program (The ISP will likely do this for you.)
- Start the digitizer program and start capturing images.

(continued on page 27)

HST's Greatest Hits of '96

Duncan Teague
 DT Publishing
 3308 Bluemont Drive
 Memphis, TN 38134-8454

The Space Telescope Science Institute (STScI) provides slides of Hubble images to individuals within regional affiliates who arrange to duplicate and distribute them. At our '96 conference, I was designated to receive and coordinate STScI materials and make them available to SEPA members.

Below you'll find a brief description of all 40 images distributed in 1996. Numbers next to the descriptions are shortened versions of STScI press release numbers, e.g., 21a refers to PR 96 21a.

The entire set of 40 slides is \$50, including postage and handling. Send your check or purchase order to the address at left.

- | | |
|--|---|
| <p>01.a Hubble's deepest ever view of the universe, revealing 1,500+ extremely faint galaxies in various stages of their development</p> <p>01.b Sample galaxies from the same Hubble deep field</p> <p>02 The inner region of a warped dust disk around Beta Pictoris once hidden because of the star's glare</p> <p>03 An image of the Egg Nebula taken by WFPC2; it shows the emergence of mysterious searchlight beams from behind a dying star</p> <p>04 The first direct image of a star other than the Sun: Betelgeuse.</p> <p>05 In more detail than has ever been seen before, the process a star like the Sun goes through when it dies</p> <p>09.a In clear, detailed pictures the first ever images of Pluto's surface; four views</p> <p>09.b Pluto surface map</p> <p>10 Gravitational lens effect captures image of primeval galaxy</p> <p>11 Images of globular cluster Mayall II, consisting of 300,000 old stars, in orbit around the Andromeda galaxy</p> <p>13.a The Helix Nebula, NGC 7293 showing collision of gases near a dying star</p> <p>13.b Helix Nebula detail with cometary knots surrounding the dying star</p> <p>14 A view of Comet Hyakutake that focuses on the near nucleus region of the comet</p> <p>15 Three layers of Uranus's atmosphere</p> | <p>taken with infrared filters; both clear and hazy layers created by a mixture of gases</p> <p>16 Image taken of Saturn where its rings appear edge on because of the position of the Earth in Saturn's orbital plane</p> <p>17 A view of several star generations found in the central region of the Whirlpool Galaxy</p> <p>18.a A rare view of Saturn's rings seen just after the Sun had set below the ring plane</p> <p>18.b A series of 10 images of several small moons orbiting Saturn</p> <p>21.a NGC 1365, a barred spiral galaxy located in the Fornax cluster</p> <p>21.b NGC 4639, a spiral galaxy located in the Virgo cluster</p> <p>22.a The Crab Nebula and a detail of the pulsar in its center</p> <p>22.b Sequence of three images showing changes in the Crab Nebula pulsar</p> <p>23.a Huge, billowing pair of gas and dust clouds in Eta Carinae</p> <p>23.b Expansion of Eta Carinae debris</p> <p>25 Hubble's 100,000th exposure captures an image of a distant quasar</p> <p>27 A vast nebula, NGC 604, which is known for a great starbirth region</p> <p>29.a 18 gigantic star clusters which may be building blocks for a new galaxy</p> <p>29.b Blue sub galactic clumps which may be galaxies under construction</p> <p>30 Jupiter's moon Io passing above turbulent clouds</p> <p>31 Clusters of stars and a fishhook shaped cloud of gases found in NGC2366, a giant star forming region</p> <p>32 Changes in Jupiter's auroral emissions</p> <p>33 Views of weather on opposite hemispheres of Neptune</p> <p>34 A Martian dust storm around the edge of the north polar cap</p> <p>35.a A survey of quasar host galaxies</p> <p>35.b A quasar caught in the act of colliding with its companion galaxy</p> <p>36.a Supersonic comet like objects in the Cartwheel Galaxy</p> <p>36.b Cartwheel Galaxy composite image</p> <p>36.c Cartwheel Galaxy illustration</p> |
|--|---|

HST's Greatest Hits of '97

The Space Telescope Science Institute (STScI) provides slides of Hubble images to individuals within regional affiliates who arrange to duplicate and distribute them. At our 96 conference, I was designated to receive and coordinate STSci materials and make them available to SEPA members.

Below you'll find a brief description of all 40 images distributed in 1997. Numbers next to the descriptions are shortened versions of STSci press release numbers, e.g., 09a refers to PR 97 09a.

The entire set of 39 slides is \$48.75, including postage and handling. Send a check or purchase order to the address

01	Central supermassive black holes in galaxies NGC 3377, NGC 3379, and NGC 4486B:	17	stars surround their mother
03	SN1987A Fireball: One tenth light year long dumbbell structure expanding at six million miles per hour in supernova 1987A	18	A collision between two spiral galaxies in the heart of galaxy Arp 220
08	Changes in the nucleus of Comet Hale Bopp as it moves closer to the sun beginning in September 1995	19	Fireworks near a black hole in the core of Seyfert galaxy NGC 4151
09.a	Transition from spring and summer in Mars's northern hemisphere; photo taken shortly before opposition	20	STIS reveals an invisible high speed collision around a supernova
09.b	Three photos of Mars taken six hours apart with 90 degree difference between images; photos taken shortly before opposition	21	Hubble pinpoints the optical counterparts of a gamma ray burst in a distant galaxy
11	The Egg nebula in which stars are born and die violently; photo shows jets of gas being blasted into space	22	Hubble captures a volcanic eruption plume from Jupiter's moon Io
12	A supermassive black hole located in galaxy M84	23	A gamma ray burst blazes from a titanic explosion in deep space
13	NICMOS captures region of the Orion nebula filled with action as a center for the birth of new stars	24	Hubble's look at Mars shows a canyon dust storm, cloudy conditions for Pathfinder's landing in July 1997
14	Supernova 1987A: different colors represent different elements in the ring	24.a	Dissipation of a large dust storm on Mars
15.a	A view of Mars's cloud cover	24.b	Hubble shows dust and water ice clouds exhibit substantial daily variations
15.b	Seasonal changes in Mars's north polar ice cap	25	Powerful telescopes discover the largest galaxy in the universe
15.c	Four views of Mars rotated 90 degrees between images during summer in Mars's northern hemisphere	26	Hubble separates components in the Mira binary star system
16	The Cone Nebula: six baby sun like	27	Hubble reveals huge crater on the surface of the asteroid Vesta.
		28	Hubble finds a bare black hole pouring out light.
		29	Hubble shows blobs of gas formed by some nova outbursts.
		30	Hubble keeps track of a fading gamma ray burst.
		31	Mars at the beginning of autumn in the Martian northern hemisphere.
		32	Hubble sees a neutron star alone in space.
		33	Hubble identifies what might be the most luminous star known.
		34.a	Hubble reveals stellar fireworks accompanying galaxy collisions.
		34.b	Detailed images of colliding galaxies.
		35	Hubble shows images of a blue straggler star.
		36.a	Hubble tracks clouds on Uranus.
		36.b	Hubble spots northern hemispheric clouds on Uranus.
		37	Hubble shows infrared view of moon, ring, and clouds of Jupiter.
		38.a	Hubble sees supersonic exhaust

Duncan Teague
DT Publishing
3308 Bluemont Drive
Memphis, TN 38134-8454

JPL '98 Slides

Duncan Teague
 DT Publishing
 3308 Bluemont Drive
 Memphis, TN 38134-8454

NASA JPL has sent us the following slides for the Galileo Mission and others. Slides are \$1.25 each.	
P 35036B	Launch of Galileo on STS 34 Atlantis
P 35213	Deployment of Galileo and IUS
P 37218	Venus Colorized Clouds
P 37327	Moon: Western Hemisphere
P 37539	Infrared Image of Low Clouds on Venus
P 37593	Earth: Ross Ice Shelf, Antarctica
P 37630	Global Images of Earth
P 40449	Gaspra: Highest Resolution Mosaic
P 41383	Gaspra Approach Sequence
P 41432	Moon: North Pole
P 41474	Earth: Northeast Africa and the Arabian Peninsula
P 41493	Earth: False Color Mosaic of the Andes
P 41508	Earth: Moon Conjunction
P 42501A	South Polar Projection of Earth
P 42964	Asteroid Ida: Five Frames Mosaic
P 44130	Asteroid Ida: Limb at Closest Approach
P 44131	Ida and Dactyl: Enhanced Color
P 44297	High Resolution View of Dactyl
P 44520	Asteroid Ida Rotation Sequence
P 44542	Comet Shoemaker Levy 9 Fragment W Impact on Jupiter
P 47058	Ganymede: Comparison of Voyager and Galileo Resolution
P 47065	Ganymede: Mixture of Terrains and Large Impact Crater in Unuk Sulcus Region
P 47162	Full Disk Views of Io (Natural and Enhanced Color)
P 47179	Three Views of Io
P 47182	Jupiter's Great Red Spot
P 47183	Dark Bands on Europa
P 47194	Live volcano on Io
P 47196	False Color Great Red Spot
P 47903	NIMS Ganymede Surface Map
P 47905	Five Color Views of Io
P 47906	Europa In Color
P 47935	Io Glowing in the Dark
P 47961	Ganymede's Nippur Sulcus
P 47970	Ganymede Color Global
P 47971	Io in front of Jupiter
P 47972	Changing Volcanoes on Io
P 48035	Stereo View of Ganymede's Galileo Region
P 48040	Natural and False Color Views of Europa
P 48063	Thunderheads on Jupiter
P 48112	Ganymede Uruk Sulcus High Resolution Mosaic Shown in Context
P 48113	Ganymede Galileo Regio High Resolution Mosaic Shown in Context
P 48114	Jupiter's Great Red Spot
P 48122	Two views of Jupiter's Great Red Spot
P 48127	Ridges on Europa
P 48145	Io: Volcanically Active Regions
P 48188	The Main of Ring of Jupiter
P 48231	Callisto Crater Chain at High Resolution Shown in Context
P 48236	Europa: Ice Floes
P 48293	Callisto: Scarp Mosaic
P 48294	False Color Mosaic of Jupiter's Belt Zone Boundary
P 48299	Asgard Scarp Mosaic
P 48445	True Color Mosaic of Jupiter's Belt Zone Boundary
P 48496	Color Global Mosaic of Io
P 48526	Europa Ice Rafts
P 48527	Closeup of Europa's Surface
P 48532	Mosaic of Europa's Ridges, Craters
P 48584	Io's Sodium Cloud
P 48698	E4 True and False Color Hot Spot Mosaic
P 48700	Jupiter Equatorial Region
P 48952	Jupiter's White Ovals, True and False Color
P 48954	Ancient Impact Basin on Europa
P 48956	Active Volcanic Plumes On Io
P 48439A	The Mars '98 Lander
P 48440A	The Mars '98 Lander
P 48494A	The Mars '98 Orbiter/ Lander
P 48495A	The Mars '98 Orbiter/ Lander
P 48567	Dr. Peter Tsou holds Aerogel
P 48589	Stardust Spacecraft
P 48691	Deep Space 1 Spacecraft

Equilibrium Temperatures of the Planets

Dennis Joseph Cowles
Louisiana Nature and Science Center
New Orleans, LA

This is the third of four technical articles Dennis submitted after the Pensacola conference. I was surprised to learn his first love is French literature. Ed.

As every planetarian knows, the Sun is the dominant source of energy in the solar system. Energy continually leaves the Sun in the form of light energy and travels outward. Some of this energy falls onto the surfaces of the planets. Some of the energy is absorbed by those bodies and some of it is radiated back into space in the form of infrared radiation. The point at which the amount of energy coming in is balanced by the amount of energy going out corresponds to a given temperature, known as the equilibrium temperature.

There is a simple equation that can be used to predict the equilibrium temperature of a body in orbit around the Sun:

$$T = (F(1 - A) / (4\pi\sigma))^{1/4}$$

T is the equilibrium temperature in Kelvins, F is the solar constant ($F = 1367 \text{ J/sec m}^2$), A is the albedo of the planet (a measure of how much light is reflected), r is the distance of the planet from the Sun in astronomical units, and σ is the Stefan Boltzmann constant ($\sigma = 5.6705 \times 10^{-8} \text{ J/sec m}^2 \text{ K}^2$).

Take a look at the equation and consider what it is telling us. The only numbers that we need to approximate the equilibrium temperature are the distance from the Sun and the albedo. The size of the planet doesn't enter into the calculation at all. The composition is involved only in how it affects the albedo.

There are three factors that are relevant that are not expressed in the equation: the rotation rate of the planet, the presence of an atmosphere, and whether the planet has an internal source of heat. The presence of any of these factors for a given planet will make the predicted temperatures different from the observed values.

How well do the equilibrium temperatures predicted by the equation actually compare with the measured temperatures? Take a look and see:

Planet	Temperature	Temperature
Mercury	434	700
Venus	232	740
Earth	249	290
Mars	210	240
Jupiter	110	125
Saturn	81	95
Uranus	58	60
Neptune	47	60
Pluto	40	40

There is a table that lists the distances and the albedos of the planets at the end of this article so that you can confirm the calculated temperatures. Compare the observed temperatures with those predicted.

As you can see, in many cases the equilibrium temperature equation predicts temperatures that are far lower than observed temperatures. The observed temperature for Mercury can be explained as an effect of a very slow rotation rate. Venus has both a slow rotation rate and an extensive CO_2 atmosphere that retains a lot of heat. Earth and Mars have atmospheres that hold heat, but not nearly as effectively as the atmosphere of Venus.

Jupiter and Saturn both radiate more heat into space than they receive from the Sun. The heat source for Jupiter is probably residual heat left over from the gravitational contraction that formed it; Saturn's heat source may be the condensation of helium atoms into the core. Uranus is an excellent fit. The reason for the difference between the predicted and observed values for Neptune is unknown. Perhaps it, too, has an internal heat source. Pluto is a perfect fit.

Even though the equation is not exact, it can still give us some idea of the temperature of various objects. This equation can be used to help students understand the influence that the Sun has in the solar system. There are a number of different projects that one can have students perform that use the equation for equilibrium temperature.

Project 1: Modeling Temperature Changes in the Solar System

The Sun formed approximately 4.5

Calculated Observed

billion years ago. The current models of stellar evolution indicate that stars slowly increase in luminosity as they age; in other words the Sun has been getting brighter over time. This will affect the value of F , the solar constant. When the Sun first formed, the solar constant was less than the current value of 1367 J/sec m^2 and it will be greater than that value in the future. (Moral: the solar constant isn't really a constant at all!)

The amount by which the solar constant changes over time is a subject of some debate. Have your students make their own guesses and use those guesses to model the change of the Earth's equilibrium temperature over time. Have them do the same for some (or all) of the other planets. What type of evidence would you look for to determine the amount of change in the solar constant? Ask the students to predict what will happen in the future as the solar constant continues to increase, both to the Earth and to the other planets.

Project 2: Asteroids and Comets

The equilibrium temperature equation holds true for comets and asteroids. Have the class determine the equilibrium temperatures of some asteroids. (The albedo ranges of the various asteroid classes are listed at the end of this article.) What happens to asteroids which travel in highly elongated orbits?

What happens to rocks on Earth that are subjected to repeated cycles of heating and freezing? (Hint: Most of the effect on terrestrial rocks is caused by water locked within the crystals in the rocks, but the effect can still occur without the water; it will simply take much longer to happen.)

What happens to comets as they approach the Sun? What role does temperature play in this? Keep in mind that pure ice has an albedo very close to 1. One idea for a project for more advanced students might be to have them find the melting points of various types of ices that are thought to be present in comets. Have them determine the approximate distances from the Sun at which those ices will begin to melt (sublimate, actually).

If a comet is at the orbit of Jupiter, what is its temperature and what gases do you expect to find outgassing from the comet? What about a comet at the orbit of Saturn?

Project 3: What if... ?

What would happen to the temperature of Venus if it were moved to the orbit of Jupiter? Or vice versa? One can spend a lot of time playing around with this one.

One of the main concerns about the emission of gases from industrial plants is their possible effect on the albedo of the Earth. Have the students determine the temperature changes that would occur to the Earth as a result of changing the albedo. What do they think would happen if the albedo changed?

Project 4: Spacecraft

The equilibrium temperature equation can be used to determine the temperatures of spacecraft anywhere in the solar system if we can make a guess for the albedo. Estimate the percentage of light that is reflected by the spacecraft and divide that by 100; that is the albedo.

Determine the temperature of a spacecraft that is at the orbit of the Earth and then determine the changes in temperature as the spacecraft travels from Earth to Jupiter or Pluto. Determine the temperature at 0.5 AU intervals. What problems can you see for the engineers who design and build spacecraft?

Project 5: Make your own solar system

Have the students invent a solar system with a single star and several planets at various distances. Have them calculate the temperatures of their planets. The equilibrium temperature will determine what chemicals can be found on which planets and what form those chemicals will take.

Have them guess what chemicals might be found on their planets. Are those chemicals liquid, gas, or solid? Can life exist on their planets? If so, which ones?

Project 6: Calculus based project

(WARNING: The Surgeon General has determined that calculus may be damaging to your sanity. It can also be habit forming.)

Have the students determine the change in the temperature of a body with respect

to both its albedo and its distance, i.e., have them differentiate the temperature equation first with respect to A and then with respect to r. Which factor has the greater effect? Why? This could be combined with Project 1.

Have the students determine the change in temperature with respect to F, the solar constant. Note: The derivatives are scary looking because they are very messy. Bear in mind that many of the terms are constant. When deriving $\partial T/\partial r$ or $\partial T/\partial A$, I suggest that you insert the numerical constants whenever it is possible and then manipulate the numbers rather than the letters. This makes the calculation slightly less imposing (at least it does for me).

I can think of some other, more advanced, projects that could be done with this equation. For example, it is possible to derive an expression for the distance r in terms of time for a closed orbit. It would be interesting to re write the equilibrium temperature equation in terms of time rather than distance and use it to graph the changes in the equilibrium temperature of an object in orbit as a function of time. Since a closed orbit is periodic, the equilibrium temperature would also be periodic.

I leave it to the reader's imagination to think of other projects.
Appendix: Albedo Data

Albedo is a measure of how much light is reflected from a body. It is always a number from 0 (reflects no light) to 1 (reflects all light). Comets have very high albedos due to the presence of ices. The Moon has an albedo of 0.12. You can find albedo data on other moons in the *Astronomical Almanac*. The albedo values listed for the planets are Bond albedos which are the ratios of total light reflected versus the

total light received over all wavelengths. The given albedo value for Earth is an average; Earth's albedo is variable, depending upon the extent of cloud coverage at a given time.

Albedo Data for the Planets

Planet	r (in AU)	Albedo
Mercury	0.387	0.12
Venus	0.723	0.75
Earth	1.000	0.36
Mars	1.524	0.25
Jupiter	5.203	0.34
Saturn	9.530	0.34
Uranus	19.200	0.30
Neptune	30.100	0.29
Pluto	39.800	0.30

Albedo Data for the Asteroids by Class

Class	Albedo	Interpretation
S	0.07 - 0.23	Stony, metal
C	0.02 - 0.06	Carbonaceous
M	0.07 - 0.20	Metal
E	≥ 0.20	Enstatite
R	≥ 0.16	Iron oxide?
P	0.02 - 0.07	Dark metal?
D	0.02 - 0.07	Organic?
U	various	Unclassifiable

able

This data was taken from the appendix of *Worlds Apart: A Textbook in Planetary Sciences* by Guy Consolmagno and Martha Schaeffer, page 303; the asteroid albedo data was taken from the same book, page 176.

Logo (Non)Contest Nets Two Win-

THE DEADLINE FOR THE NEXT IS
SUE OF SOUTHERN SKIES IS APRIL

1. SEND SUBMISSIONS ON A 3.5
DISK OR VIA EMAIL ATTACHED FILE
TO STARMANTNG@AOL.COM OR
TO TEAGUED1@TEN.NASH.TEN.K12.

After six months and a deadline extension only two people submitted designs for a new SEPA logo: Scott Landstrom and Adam Thanz. Council decided that even with this general lack of interest, it would be proper and appropriate to divide the \$50 prize money between Scott and Adam. So, guys, thanks for your support, and look for your \$25 checks in the mail.

Logo (Non)Contest Nets
Two Winners
Mike Chesman, President
Bays Mountain Planetarium
Kingsport, TN

Christmas Star Programs in State Supported Planetariums: Legal Concerns

The good ol days

Planetarium science educators have enough to worry about without fearing litigation over popular programs they have given for years. From the earliest days of planetarium Christmas Star programs to perhaps as recently as ten years ago, it would have seemed absurd for anyone to question our giving our annual Christmas Star programs. Traditionally, such programs often have been the most popular of the year and, besides, they are a reflection of our Christian heritage.

Times however, have changed. Yes, when I was in my public junior high school, we had Christian prayers and even Bible reading every morning, and Christian hymns over the public school public address system. We even had performances of Handel's Messiah for our Christmas program convocation in High School (c. 1966).

No one seemed to worry about law suits over such acts, nor about the ACLU or even religious neutrality. Such suggestions were tempests in teapots! Jewish students (or the rare student of other non Christian persuasions) were, at best, simply excused from attending if they or their parents were upset with the explicit favoring of Christianity and usually conservative or even fundamentalist versions of it at that.

Times have changed

As most of us know, though, much has changed since those days. Some of us may feel the change has been a great mistake, or even a tragedy we need to return to the good ol days of family values (fundamentalist Christian dominance?). Others feel the changes are overdue we need to repent our long period of religious intolerance and quit using the public schools and related planetariums as evangelistic outreaches of what is equivalent to a State Church. With the exception of the power of our vote, however, our opinions on the matter make little difference. Rather, political trends and the consequent revisions of how the U.S. Constitution is interpreted decide what we legally can and cannot do.

Why no problems in the past?

Planetarians have been relatively isolated from attacks based on church state separation over the years. Because biology is only a minor element, if extant at all, in planetarium programs, planetariums largely have avoided the creation/ evolution controversy pressures on program content for example. One, however, needs only read the literature of the National Center for Science Education or even follow biology teaching journals to be aware that a constant and continuing battle is being waged now in our country over the appropriate content of biology teaching in the public schools. Much of this controversy erupted in the 1970-80s period with the rise of creation science. Debates about creche scenes on public property, graduation prayers, and so on are relatively recent as well.

As a whole, public planetariums have been immune to attack also because they have avoided the more sensitive religion/ science controversies either by being silent on them or by promoting views popular with their largely Christian audiences. Suits require that someone be upset enough to press issues. There is one area, however, where planetariums are particularly vulnerable, at least in recent times: Christmas Star programs.

Tempest in a teapot?

Over a period of several years now, I expressed some concern about implications, for Christmas Star programs, of the trends of recent legal reasoning (Kanagy 1987; 1990; 1994; 1997). Gregg Williams, of the Merrillville Community Planetarium (Indiana), remarked some time ago that many planetarians thought the concerns were a tempest in a teapot. Later, planetarian John Mosley (1991, p. 22) likewise dismissed any concern by noting that, ... the issue [of church state separation and Christmas Star programs] has come up only in conversation.

There are at least two issues here: (1) Has there been any serious legal challenge to doing Christmas Star programs up to this point? (2) Should the right situation arise (an irritated religious minority mem

ber/ACLU activist/ atheist decides to press the issue), can we say there would be no basis legally, or on the basis of sensitivity to religious pluralism, to question the appropriateness of Christmas Star programs (or at least some versions of them)?

The answer to (1) is probably no. The answer to (2), however, is much less clear.

Bases for Legal Concerns

Although it is true that no legal challenge to Star shows has been raised formally as yet, the potential for such is strong and articles have appeared on this very issue (Levinson 1987). Constitutional Law expert Rosalie B. Levinson has remarked (Levinson 1992):

As with star programs, Lee [the Lee v. Wiesman case] raises the question of [the] only once a year issue, i.e., a benediction delivered by clergy at graduation ceremonies. It appears from oral argument that at least in the context of the school setting, the Court is probably not ready to abandon the three prong analysis [Lemon Test see below] which again suggests that planetarium [Christmas Star] programs, even if voluntary as is attendance at baccalaureate services, is [sic; are] still problematic. Further, unlike the pending case, the star programs probably involve expenditure of public dollars and participation by school officials even more so than bringing in outside clergy in Lee.

Also, as I noted in my 1987 article (Kanagy 1987), any planetarium that does Christmas Star shows in which children are in attendance exacerbates the ethical and legal concerns with such shows. Children, and most adults for that matter, may have difficulty reconciling: (1) the apparent support for belief in astrology implied by the Magi's success after interpreting a celestial sign with the coincidence argument (that astrology just happened to work in this case; Kanagy 1996). [Ethical problem] or (2) the strong case presented for a celestial event that amazingly fits Matt. 2's Star story with the strange, and probably fallacious, claim that we have not thereby confirmed in some way the historicity of the story of the Christmas Star in Matt.

2 (Mosley 1987, p. 53). [Legal problem]. It is also rather unlikely that the courts would buy the latter argument: rightly or wrongly, public institutions are not considered constitutionally appropriate places for Christian apologetics.

Christmas Star programs typically involve: (1) Interpreting the details of the biblical text and giving preferences for particular interpretations of that text. (2) Constructing an involved scenario supporting how a planetary conjunction (supernova, comet...) provides an amazing fit to most of the details of the biblical story, thereby seemingly implying the story's overall historical accuracy. (3) Attaching, in rare instances, a disclaimer something like We have proved nothing about whether there ever really was a Christmas star. (paraphrasing Mosley 1987, p. 53).

Any true Christmas Star Show, as opposed to a mere winter solstice show, must inevitably involve the planetarian in biblical exegesis (interpretation), at least to the extent of identifying the literary genre of the relevant text. Matt. 2, the sole source of any claim to the existence of such a Star, must be interpreted, and interpretation of a biblical text often, and perhaps always, involves making particular theological presuppositions. It is an axiom of hermeneutics that excising verses (those on the Star for example) from their wider biblical context is usually bogus exegesis (-eisegesis). As far as I know, no planetarian involved in doing Christmas Star programs has dealt with the awkwardness, questionable ethics, and perhaps illegality of this entanglement of church and state.

What generally is done, based on my reading of a large number of planetarium Christmas Star scripts, is either (1) a plausible argument by the non-theologically trained astronomer or educator is given for how to interpret the text, (2) a literal interpretation simply is presumed without comment or justification, or (3) a theologian of a particular theological persuasion is appealed to as an authority to justify the interpretations given, much as Mr. Mosley used the views of a particular rabbi, Rabbi Wachsmann (Mosley 1988), to justify his position on the Shekinah Glory in Christmas Star shows.

Common Agreement is not enough. The agreement of all of us on the basic meaning of the words in Matt. 2 is irrelevant we still have interpreted the texts or accepted

someone else's interpretation. One or more of these hermeneutical methods may be plausible, rational, or even true. My concern is how a modern version of Judge Overton (who declared some key creationist sponsored legislation unconstitutional; Overton 1982) would evaluate the legality of any biblical interpretation, no matter how plausible, in public funded planetariums. Also, the issue of what is appropriate in a book or journal article and in many other contexts must be kept distinct from what is proper in a public funded, secular planetarium whose audiences often consist of a significant number of children.

The Lemon Test The Lemon Test to which Levinson implicitly refers (above), along with related reasoning in the courts, involve the following principles: A practice is constitutionally illegal if (1) it results in the State giving preference for one religious viewpoint over another; the State must be neutral in matters of religion [Establishment Clause of the First Amendment], (2) it involves the State in excessive entanglement with religion or religious issues; (3) it puts the State in a position of being hostile to a particular religion or to religion in general [Free Exercise Clause of the First Amendment].

As Levinson reminds us, although the courts may vary in how strongly these rules are pressed, the criteria still serve as important guidelines in court decisions.

Serious constitutional concerns arise when planetariums at publically funded planetariums favor a particular model of the religion science relationship over others in their programs. Let us consider one illustration:

Mosley (1991, p.27) argues that Wenning's Christmas Star programs (involving the Shekinah Glory as the Star) are inappropriate because they involve ... uncritical mixing of religion and science... Let us examine this concern in more detail:

There are at least three perspectives on the relationship of science and religion, and recent legal reasoning suggests the secular planetarium, as a representative of the State, should not take an official stance on any one of these perspectives:

I. The mutually exclusive model: science and religion deal with two totally separate fields of human experience. Science deals with all matters of the

natural world; religion deals with moral and ethical issues, salvation, and faith. (The National Academy of Sciences, in its position statements on creationism, has taken this position.)

II. The overlap model: although science and religion often deal with different human concerns, there is a realm of overlap the realm of physical phenomena which bare an essential relationship to religious belief. Examples: the physicality of the resurrection of Jesus from the dead; the Flood of Genesis 6.

III. The subsumption model: In one version of this, science subsumes religion and religion is just science applied to the supernatural. All is science. (Scientism). In another version, religion subsumes science; science is just the part of religion that deals with physical phenomena. All is religion. (Creation scientists take this third view).

Many scholars favor Model I, as Mr. Mosley seems to do (Mosley 1988): ... religion is fine and has its place, but it's not the same as science. The two are different... Many conservative Christians, however, favor Model II, and there are a significant number of scholars who agree with them. The excessive entanglement issue suggests, however, that the planetarium in his/her professional practice cannot simply presuppose his/her personal favorite of these choices as if there were no debate on the matter. A further statement that a religious explanation, doesn't have the same validity as a scientific explanation (Mosley 1988) is particularly problematic if, as the Lemon Test indicates, we should not be hostile to religion in the legal sense.

Is the planetarium the place preferentially to press personal ideologies, even if they are popular ones? Is it any more appropriate, legally, for a planetarium who is active in sceptics organizations to promote religious scepticism in a state supported planetarium than it is for a creation science supporter to subtly promote creation science in the same planetarium?

Physical phenomena are important to the religious beliefs of many religions and their sects. For example, within Mormonism, God is not an immaterial spirit located in some spiritual heaven. Rather, He is a physical being inhabiting a physical planet near the physical star Kolob. The truth of

such claims are, potentially at least, in the realm of scientific testability.

Mormonism makes certain testable archeological claims as well claims which many non Mormon archeologists judge to be false (Williams 1991). Is it appropriate for archeologists, as scientists, in their public museums to itemize the scientific evidence refuting Mormon archeology? Is a refutation of Mormon archeology an attack on their religion?

Mormons seem to think so. Similarly, the increasingly popular activity of attacking fundamentalist Christianity (Mosley 1991, p. 28) in the name of good science education seems constitutionally illegal when judged by the hostility to particular religion test, no matter how pedagogically important may be.

A Couple of Proposed Solutions:

Ecumenical Solution Unacceptable Some planetarians have suggested an ecumenical approach (bring into one's talks a variety of religious interpretations, but treat them all as equally valid). See Mosley (1991, p. 30) for example. Sadly, this approach involves taking a particular stance on the nature of religion: a stance that is anathema to many Catholics, fundamentalist Protestants, Moslems, Orthodox Jews and many others. Bahai, liberal Christianity etc. may find such an approach acceptable, but it has been declared unacceptable by many scientists and by legal authorities in the analogous controversy over creation science in the public schools (La Follette 1983).

The Redeeming Secular Value Solution An example of this proposal is Mosley's (1991, p. 32) Winter Solstice Christmas Star Show: A discussion of the sun's movements and the symbols associated with its return can enrich the astronomical content of a [Christmas Star] show, giving it secular meaning consistent with the establishment clause of the Constitution.

Would a discussion of tides and the dynamics of ocean waves during a global flood give discussion of Noah's Flood in the public schools geological content, thereby giving the discussion secular meaning consistent with the establishment clause? Why can't Mosley's what if scenario (Mosley 1991, p. 24) equally justify a Noah's Flood show in a natural history museum?

As I have argued elsewhere (Kanagy 1990), we cannot be consistent attacking creation science in the public schools while at the same time defending our Christmas Star shows by using the very arguments creationists use to defend creation science, unless we think they are in fact sound arguments and that the courts have unfairly excluded creation science from the public school science classrooms. In reaction to my 1990 article on creationism and Star programs, James Randi, a noted expert on pseudoscience who has spoken for planetarium associations against astrology and related pseudoscientific practices, has said: The parallels between creationism, Genesis Flood, and the problem under discussion [Star programs] are apt and powerful. It all sums up nicely in your final sentence: Can you make a good case that Star programs are not akin to creation science? My answer: No, I cannot. (Randi 1991). A tempest in a teapot?

Conclusion

I don't claim expertise in constitutional law, although I have read widely in its literature, worked with such experts as Dr. Rosalie Levinson of the Valparaiso University Law School and with Charleston Southern University's expert Dr. Douglas MacPherson, and published several articles directly or indirectly discussing constitutional law issues and the planetarium (Kanagy 1987, 1989, 1990, 1994, 1997).

My primary goal is to urge serious thought and dialogue on these concerns. Perhaps it is all a tempest in a teapot, but I think that planetarians who bother to educate themselves on the legal reasoning in other religion science overlap cases (viz., creation science, prayer in the public schools, etc. see La Follette 1983 for example) will agree that the tempest has the potential to grow to the point of causing those who give Christmas Star shows serious grief. The illustrations given here are meant only to give readers a flavor for the complex issues involved.

REFERENCES

Kanagy, Sherman P. (II) 1987, Religion and Pseudoscience in Christmas Star Shows, Planetarian, 16 (4), 12-20, (Oct.).

1989, A Defense of the Appropriateness of the Star of Bethlehem as a Topic in Science Education, Proceedings of the 24th Annual GLPA Conference, ed.

by Dale W. Smith (GLPA; conference in Bowling Green, Ohio, Oct. 19 22, 1988), pp. 83 93.

1990, Are Christmas Star Programs in Secular Planetariums Akin to Creation Science in the Public Schools? Proceedings of the 25th Annual GLPA Conference, ed. by Dale W. Smith (GLPA; conference in Champaign, IL, Oct. 18 21, 1989), pp. 69 75.

1994, Quantum Cosmogony and the Establishment Clause, Proceedings of the International Planetarium Society, ed. by Michael T. Hutton & Mary Thrall (IPS; conference in Cocoa Beach, FL, July 10 16), pp. 55 57.

1997, Do Christmas Star Programs Support Belief in Astrology? Southern Skies, 17 (4), 22 24, (Fall).

LaFollette, Marcel Chotkowski 1983, Creationism, Science, and the Law (MIT Press, Cambridge, MA).

Levinson, Rosalie B. 1987, The Constitutionality of Government Sponsored Christmas Programs in Planetariums, Proceedings of the 23rd Annual GLPA Conference (GLPA; conference in Merrillville, IN, Oct. 28 31, 1987), pp. 28 31.

1992, Valparaiso University School of Law, personal letter to S. Kanagy, dated Feb. 10.

Mosley, John 1987, The Christmas Star (Griffith Observatory, Los Angeles, CA).

1988, More on the Glory of God at Christmas, Planetarian, 17 (2), 6 8, (June).

1991, In Defense of Christmas Star Shows, Planetarian, 20 (4), 18 33, (Dec.).

Overton, William 1982, Creationism in Schools: The Decision in McLean versus the Arkansas Board of Education Science, 215, 934 943, (Feb. 19).

Randi, James 1991, personal letter to S. Kanagy, dated Aug. 25, 1991.

Williams, Stephen 1991, Archaeology and Religion: Where Angels Fear to Tread, Chap. 8 (pp. 156 188), Fantastic Archaeology: The Wild Side of North American Prehistory (Univ. of PA Press, Philadelphia)

members of other professions, and endeavor to inform members of related professions of services provided by the planetarium profession.

Employer Employee Relations

While maintaining his/her position in order to serve patrons, the planetarian is rewarded with working conditions and compensation which allow him/her to devote his energies to his/her job. The ethics of dealing with one's employer is a two way street, and corporation and institutional members of the society as well as individual members are enjoined to abide by the Code of Ethics.

In fulfillment of the employer employee agreement, the planetarian:

- shall adhere to the terms of a contract or appointment, unless these terms have been legally terminated, falsely represented, or substantially altered by unilateral action of the employing

agency;

- shall apply for, accept, offer, or assign a position of responsibility on the basis of professional preparation and legal qualifications without discrimination on the grounds of race, color, creed, sex, or national origin;
- shall not delegate assigned tasks to unqualified personnel;
- shall not knowingly withhold information regarding a position from an applicant or misrepresent an assignment or conditions of employment;
- shall apply for a specific position only when it is known to be vacant and shall refrain from underbidding or commenting adversely about other candidates;
- shall uphold the principle of appropriate and adequate compensation for those engaged in the profession;
- shall use time granted for the purpose for which it is intended;
- shall not accept outside employment

information to your programming.
Barbara: Such as Shoemaker Levy 9 impacts?

Glenn: Exactly. Other possibilities, if the budget allows, would be multiple video sources, all sky projection, and of course, panoramas. All of these systems require an automation control in order to function in a lucid and coherent program. It is not always advisable to have a planetarium program narrated for an entire 45 minutes; in fact, I have found the most success, as judged by both teachers and students, to be 20 to 25 minutes of narration, during which a great amount of information can be presented concisely. This would then be followed by a 15 20 minute live interaction with students in a question and answer format about the program they have just seen. This leads to quite a dialogue between the presenter and the students. They hopefully will leave your facility with a deeper understanding of the subject matter than they would have gotten with a fully narrated program.

Barbara: What about weekend programs?

Glenn: Fourth, weekend programming should include a show especially for children, a live sky program teaching people to appreciate the natural history of the universe, as well as how to locate objects of interest in the night sky. In addition, there should be a full length feature program, which would appeal to students and adults. Weekend programming must change approximately quarterly to inspire repeat visits of the

general public to your planetarium.

Barbara: This is sometimes difficult isn't it, given the limited numbers of staff in some smaller facilities? We are fortunate in being part of a museum with exhibits (art and science) and other departments to add variety.

Glenn: My fifth point is that learning to make do with what you have in the most creative way is your best tool. This can be accomplished by studying and experimenting on your own or taking such classes at a community college as video editing, photography, and even machine shop, so that you may fabricate expensive special effect projectors at an extraordinarily reduced cost. You may never pack em in as some facilities are able to do with Rolling Stones or Pink Floyd laser shows, or with wide field movies, but your numbers will exceed the national average for your dome size and geographic area. I make this statement based upon our figures: we have exceeded the national averages from 1992 to the present. We currently have between 33 35% greater visitation than planetariums matching our metropolitan area population and dome size [30 feet, Spitz 512]. Vendors do not call on me, because they know I cannot afford many things I've seen demonstrated at various museum/planetarium multimedia conferences, such as virtual reality systems and high priced laser systems.

Barbara: Small domes, small budgets?

Glenn: If that last statement sounds like I'm green with envy and consumed with

Interview with a
Planetarium Director
continued

Ideas:

Network: Identify multiple locations which can put pictures of an event on the net.

Virtual observatory: Arrange for individuals online to point their Web browsers to a site that is open and then enter coordinates to point the telescope. After a few moments you could see what the telescope is pointed toward. Of course if this were automated, there would be the problems of people getting the telescope to point toward the ground or perhaps endanger the equipment by pointing it toward the Sun during the day.

Chat area: where people may comment and ask questions of an astronomer about the event being shown.

Suggested reading:

- Astronomy Online, by Stuart Goldman, Sky and Telescope, Feb. 97
- Digital Camera Companion, Sawyer & Prentiss includes CD ROM and software

VLM Planetarium Homepage
<http://users.visi.net/~stargazr>

VLM Homepage
After November 3, 1997 it will be:

Astronomy on the Internet
continued

Digital Cosmos: Astound-ing Presentations



Alicia Cooper
Sophomore Intern
Craigmont Planetarium
Memphis, TN

I recently explored Astound 3.0 for Macintosh and was extremely impressed. I did not create a difficult presentation but I did complete the simple tutorials the manual took me through. This taste of Astound coached me with seven lessons in which I

learned to create a slide show using a template. In two hours the tutorial showed me how to add text, video, animation, and sound to my slides. I discovered how to make pieces of my presentation animated and interactive. I was taught how to create animated charts and completely edit and master my presentation. Finally, I learned the methods for playback and distribution of my presentations. All it takes is a click of the mouse with this easy to use but brilliant program.

The manual that comes with the program had a 23 page section seven tutorials for those who had never used Astound and wanted to try to complete a presentation and get the feel of things before creating one on their own. This section was just for me. When Astound first appeared there was a screen with the following four options: Create With a Template, Create Without a Template, Open a Presentation, and Exit Astound. Since this was my first time to use Astound, I was directed by the tutorial to click on the button Create With a Template.

I was unsure exactly what a template was, but I found it to be a series of pre-made master slides which you can use to create your presentation. This screen was then brought up for me to choose which ready made presentation I wanted. After naming my presentation, I clicked the OK button, and I was on my way!

In Tutorial 1, I edited my slide by adding text to a placeholder and adding a chart. The text was very easy to replace, and there were many options available for the layout of this text under the Slide menu

on the menu bar. Adding a chart was just as simple. A dialog box appeared. I chose from a wide array of chart formats and edited my chart in a variety of ways.

The manual next took me through a tour of the landscape. I noticed the tool bar on the left side of the screen. This bar has many options that allows you to insert and edit actors, video, sound, pictures, and more with just a simple click of the mouse. There was also a tool palette available that gave the same options. This palette floated, so I could position it where I wanted.

I was then instructed to on how to add a movie, an actor, and background music to my presentation. I imported a pre made movie with three easy steps. Astound also allows one to add resources (actors) by clicking on placeholders or by double clicking the appropriate buttons in the tool bar. I added a animated airplane as my actor. This plane, as any actor, moved across the bottom section of the screen.

Next, I was able to add background music to my slide. I chose some pre recorded music, but in Astound you can add your own music or even narration. These three additions were very quick because all the things were located on the tool bar. I played the presentation and thought it was amazing.

In Tutorial 3 I learned how to animate my presentation. Any objects that you place on a slide a picture, shape, text, video, or actors can be animated in Astound. You animate objects by using transitions, the special effects which control how an object appears or disappears from the screen. These including dissolve, wipe, and ripple. Path animation allows an object to travel across the slide during playback. The timeline window lets you control when each object appears and disappears and how quickly it animates.

Transition and animation path were very easy to use and had wonderful ending effects. The timeline option, however, was confusing. One uses the timeline, moving a bar back and forth with the mouse to control both when the object appears and how quickly it animates. Unfortunately, I couldn't get it to work for me.

Next I added interactivity to my pre

sensation. This gives you control of your presentation while it plays back, and it helps you maintain the audience's attention by jumping from one topic to the other. Any button, shape, or picture can be interactive. There were many pop up menus to specify what I wanted, and the object I chose to make interactive did as expected. I felt that this was an awesome effect, and it was very easy to do.

Astound allows you to present your information in any of several chart types: pie chart, bar chart, area chart, scatter chart even a pictograph or table. You can add animation and pauses to your chart as well as colors that best complement your presentation. I did this by editing the chart I added to my first slide in the opening tutorial. Using only the dialog box, I was able to totally change the chart's appearance by adding a color series, labels, and a picture outline for my bar graph. Nine tabs are available containing many options for you to specify what you desire. This is a useful step but the computer tends to get slow, so be patient.

I was almost finished, but the manual led me through a presentation mastery to make sure this was exactly what I wanted. I went to outline view, clicking on the icon on another tool bar to the right of my screen, and this allowed me to view and edit my entire presentation using a outline format. There were no pictures but just the guts of everything I had chosen to go into my presentation in a chart form. This was an excellent way for me to simplify, organize, and structure my presentation all at once.

It also helped me change that one thing that could be crucial to my presentation without any trouble. I then edited my text format attributes. I changed the font and alignment of the text and changed the color of my title fonts in my slide show. I selected the option Apply Changes to Entire Presentation. I loved this because it cut down on much work.

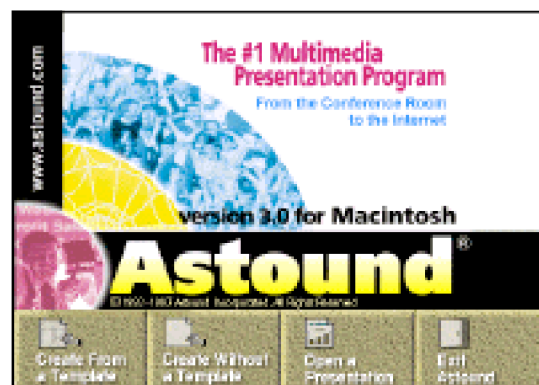
Finally in the last tutorial I learned playback and distribution. Using the playback mode, you can play back a presentation within Astound, through Astound Player, or as a self running presentation. The self running presentation is handy for when you might want to distribute your message to people who do not have access to Astound. I chose the self running presentation.

I set this playback option by setting

up my cursor and notation pens. I went under the file menu and chose the option sub menu. This menu gave me many choices for controlling the final playback of my presentation. Astound allowed me to configure my very own custom playback. I then went to the Set Pens menu which was an excellent way for me to emphasize words or points during my presentation. It allowed me to circle or underline them by just pressing the space bar and dragging my mouse thus painting color under certain words of my choice.

I learned that Astound could distribute a saved presentation on the World Wide Web, by e mail, CD ROM, floppy disk, over a network, or on a local hard drive. You can also print handouts, speaker notes, or transparencies. The manual showed me how to do this, but I was unable to try. The review copy wouldn't let me save my presentation. Astound also has the option to import a Powerpoint presentation. I did attempt this from a floppy disk, and it worked wonderfully!

If you cannot tell already, I am impressed with this program to the fullest. I would absolutely recommend the purchase of Astound. It works wonders and can allow for an informative and very interactive presentation. Astound was one of the easiest programs that I have ever used, and the manual basically holds you by the hand and leads you through each and every option available. I found no faults in Astound, except the timeline problem, but overall I give it two enthusiastic thumbs up. I can almost promise that anyone who tries Astound will be amazed at its capabilities and features. For more information on Astound call 800 982 9888 or see their site on the World Wide Web at www.astound.com.



Astound's opening screen of four buttons lets you create or open a presentation.

New Telescope at the Bishop Planetarium

George Fleenor
Bishop Planetarium
Bradenton, FL



Southern Skies

VOLUME 18, NUMBER 1

JOURNAL OF THE SOUTHEASTERN PLANETARIUM ASSOCIATION

WINTER 1998

In This Issue

President's Message.....	1
IPS Report.....	2
Editor's Message.....	3
SEPA Membership Form.....	3
Featured Planetarium: Buehler Planetarium, Davie, Florida.....	4
Small Talk.....	6
Astro-Video Review: From Here to Infinity: the Ultimate Voyage.....	7
Her Own Space: An Interview with a Planetarium Director.....	8
Book Review: The Demon-Haunted World, by Carl Sagan.....	9
News from SEPA States.....	10
SEPA Code of Ethics.....	15
Astronomy on the Internet.....	16
HST's Greatest Hits of '96.....	18
HST's Greatest Hits of '97.....	19
JPL '98 Slides.....	20
Equilibrium Temperatures of the Planets.....	21
Logo (Non)Contest Nets Two Winners.....	23
Christmas Star Programs in State Supported Planetariums: Legal Concerns.....	24
Digital Cosmos: Astound-ing Presentations.....	30
New Telescope at the Bishop Planetarium.....	32

Southern Skies is the quarterly journal of the Southeastern Planetarium Association published for the purpose of communicating association news, reports, reviews, and resources to its members. Contents © 1998 by the Southeastern Planetarium Association and individual authors. Permission is granted to reprint articles in other planetarium, astronomy, or science related publications under the following conditions: 1. Attach a credit to the article stating, "This article was originally published in Southern Skies, journal of the Southeastern Planetarium Association;" and 2. Send courtesy copies of your publication to the Southern Skies editor and the author.

Officers

President
Mike Chesman
Bays Mountain Park Planetarium
853 Bays Mountain Park Drive
Kingsport, TN 37660
Voice: (423) 229-9447
Fax: (423) 224-2589
Email: baysmtn@tricon.net

President-Elect
George Fleenor
Bishop Planetarium
20110th Street West
Bradenton, FL 34205
Voice: (941) 746-4132
Fax: (941) 746-2556
Email: Jetson1959@aol.com

Secretary/Treasurer
Duncan R. Teague
Craigmont Planetarium
3333 Covington Pike
Memphis, TN 38128-3902
Voice: (901) 385-4319
Fax: (901) 385-4340
Email: StarMarTNG@aol.com

Past-President
Kristine K. McCall
Sudekum Planetarium
800 Fort Negley Boulevard
Nashville, TN 37203
Voice: (615) 401-5077
Fax: (615) 862-5178
Email: mccalk@ten-nash.tenk12.tn.us

IPS Council Representative
John Hare
3602 23rd Avenue West
Bradenton, FL 34205
Voice: (941) 746-3522
Fax: (941) 747-2556
Email: jlhare@aol.com

Southern Skies Editor
Duncan R. Teague
3308 Bluemont Drive
Memphis, TN 38134-8454
Voice/Fax: (901) 388-3266
Email: StarMarTNG@aol.com

Associate Editors

AstroVideo Review
Mike Chesman
Bays Mountain Park Planetarium
853 Bays Mountain Park Drive
Kingsport, TN 37660
Phone: (423) 229-9447
Fax: (423) 224-2589
Email: baysmtn@tricon.net

Digital Cosmos
Joyce Divina
Science and Space Theatre
1000 College Boulevard
Pensacola, FL 32504
Voice: (904) 484-2581
Fax: (904) 484-1865
Email: jdivina@pjcc.fl.us

Featured Planetarium
Dave Hostetter
Lafayette Natural History Museum
and Planetarium
637 Girard Park Drive
Lafayette, LA 70503
Phone: (318) 268-5544

Laser Talk
Mark Howard
Buehler Planetarium
3501 SW Davie Road
Davie, FL 33314
Phone: (305) 475-6681
Fax: (305) 474-7118

Reviews
Patrick McQuillan
Alexander Brest Planetarium
1025 Museum Circle
Jacksonville, FL 32207
Phone: (904) 396-7062
Fax (904) 396-5799
Email: PatAstro@aol.com

Small Talk
Elizabeth Wasiluk
Berkeley County Planetarium
Rt. 1, Box 89
Hedgesville, WV 25427
Phone: (304) 754-3354
Fax: (304) 754-7445