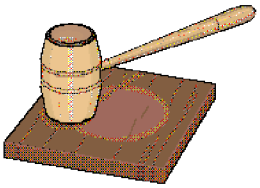
President's Message

Kristine K. McCall
President
Sudekum Planetarium
Nashville, TN



If you weren t at the Mark Smith Plan etarium in Macon, Georgia between June 20 24, 1995, you really missed some thing. Anyone who thought Georgia in June was a bad idea was woefully wrong. Jim Greenhouse and Carol Helper put on a great show even though circumstances conspired against them in a major way.

Imagine this scenario. Half the Museum had been demolished as part of a major renovation project. They couldn t run the air conditioning in the Planetarium and the star lamp at the same time. The bathrooms were outside (in a trailer).

I must admit having some concerns that no matter how talented the staff or how hard they worked, Jim and Carol would not be able to overcome these obstacles. In that regard, I was woefully wrong. At last count, seventy nine delegates had regis tered for the full conference with another dozen or so there for particular days.

There was a healthy variety of shows. Papers ranged from detailed and techni cal to mildly humorous. Several excellent workshops were offered. There was plenty of vendor access time. Hope you were there for a very enjoyable, worthwhile meeting.

In addition to the monumental efforts of Jim, Carol, the rest of the Planetarium staff, and the entire Museum of Arts and Sciences, I d also like to recognize the special contributions of Phil and Julie Groce.

On top of all the sessions, snacks, and schmoozing, there was a fair amount of business to handle at the business meet ing. I would like to take this time to ad dress some of the major points.

JOURNAL Keep those articles, reviews, news tidbits, and comments coming. See the inside front cover for submission in formation and the names of the column editors. I hope everyone will agree the transition from Linda Hare (Bradenton, FL) to Duncan Teague (Memphis, TN) has gone rather well.

IPS John Hare (Bradenton, FL) reported the IPS Council will meet in the fall to entertain bids for the 2000 conference. They ll make a final decision next sum mer when IPS meets in Osaka, Japan. For more details about that meeting, contact Bill Gutsch. Then there s always London in 98.

NSTA Dr. Paul Campbell (Bowling Green, KY) will attend the CAG (Council of Affiliated Groups) meeting in Columbus, GA, this summer. While there, he will work to advance the SEPA Goals for Astronomy Education. Astronomy has traditionally been poorly represented in the NSTA arena. Biology, chemistry, and, to some extent physics and earth science, are the major players. Our progress and successes may be slow and relatively [small], but one has to start somewhere. Dr. Campbell has generously offered to represent SEPA with no cost to our organization.

EDUCATIONAL GOALS Each state in the SEPA region has a member who is spearheading efforts to get SEPA s educational goals in cluded in state curriculum objectives and standards. Some progress is being made, albeit slow. Read elsewhere in this issue for the advances being made in Mississippi and other places.

If anyone else has the opportunity to spread the word about the goals, please do not hesitate to take advantage of it. Keep me or your state representative informed of progress or setbacks that occur. We have a long way to go, but every step forward puts us one step closer to better astronomy and space science education.

NATIONAL PLANETARIUM COUNCIL (NPC) Bob Tate (Atlanta, GA) reported that NPC exists. Standing rules for taking action have been adopted. Dale Smith (Bowling Green, OH) has been chosen to serve as Chairman, and Bob Tate is Secretary/ Treasurer. After a somewhat rocky start, the NPC is now considering proposals for a wide variety of projects. If you have ideas or comments, please share them with the Council. An NPC update should appear in the regional journals as events occur.

SECRETARY/ TREASURER S REPORT Duncan Teague has found a good banking arrange ment for SEPA with no charges and which actually pays interest. As of the business meeting, there was about $4,000 in the bank. He also reminded us all that the SEPA dues year is the calendar year (January through December) and not the conference year (June to June). Please keep that in

mind when your IPS, GLPA, and other dues are due.

1996 CONFERENCE I gave an update on plans for Nashville in 96. Rather than repeat all that here, watch Southern Skies for more information.

1997 CONFERENCE Then we heard not one, not two, but three bids to host SEPA in 1997. Dr. Dave Menke and the Buehler Planetarium in Fort Lauderdale, FL; Britt Rossi and Gary Close from the Hopkins Planetarium in Roanoke, VA; and Clint Hatchett along with Frank and Carol Palma from Pensacola Junior College in Florida all made great presentations. It actually took two votes for Pensacola to win the 1997 conference. I sincerely hope that Roanoke and Fort Lauderdale will consider bidding again in the future. Next summer will be here before we know it. Start thinking about it now. We will need bidders for 1998. There is always 99. What about 2000?

SPECIAL ELECTION FOR PRESIDENT ELECT As reported in the last issue of Southern Skies, Rick Greenawald has moved to Twin Falls, ID, to become Director of a swell, new, 50 foot, Digistar facility. According to the SEPA bylaws, he had to resign his position of President Elect. Since we had enough notice, Council decided to hold a special election in Macon to fill the vacancy. Dave Hostetter (Lafayette, LA) agreed to chair the nominating committee and called on Bob Tate and Sue Griswold (Charlotte, NC) to assist him.

After some deliberation and a number of phone calls, Mike Chesman (Kingsport, TN) and Dave Maness (Newport News, VA) agreed to run. Their statements were published in the last Southern Skies. The members voted during the business meeting, electing Mike Chesman to replace the abdicating Rick Greenawald. I should point out that three of the five members of the SEPA Council are now from Tennessee. Hmmm... .

BYLAWS CHANGE The last item on the agenda was the proposed change to the bylaws that was submitted by a special committee consisting of chairman Jon Bell (Fort Pierce, FL) along with Dave Hostetter and Cyndi Zeger (Salisbury, NC). The proposed change was published in the last Southern Skies. However, once we all got together in Macon, a question arose regarding the interpretation of the state ment that had been published. A clarifying revision was written, agreed upon, and presented at the pre business meeting. The clarification read as follows:

Full membership may be extended to persons who are engaged in the ad ministrative, professional, educational, or technical activities at a planetarium in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia or all U.S. Territories off the southeastern coast of the U.S. or who reside in the SEPA region (listed above) and provide substantial support services to planetariums.

Two corrections were made when dis cussion started at the main business meet ing. It was changed to read, ... or any U.S. Territories off the southeastern coast...

I ve tried to remain neutral, but some members have strong feelings about vot ing privileges and membership. During the course of the business meeting a wide variety of opinions was expressed. After the debate and discussion, the proposed change to the bylaws was voted on and approved by the members present.

It seemed the matter had been resolved, but that was far from the case. Saturday morning, a number of people came to me with serious concerns. Consequently, I didn t get to eat much breakfast.

The thing that aggravated me the most is that no one bothered to come to me before the business meeting to complain about the proposal or suggest alternatives; even though I specifically invited people to do so if they had comments to make. That really irritated me. If someone had been able to make the case that this was a bad change, Council might have tabled the measure to allow further consideration and revisions before bringing it to a vote. Instead those people waited to express their displeasure after the fact.

But that was now all water under the bridge. Council met immediately to discuss what action should/ could be taken to ad dress the membership concerns.

After considerable discussion (and miss ing a number of papers), Mike Chesman volunteered to chair a special committee to investigate and evaluate the membership practices of SEPA. In a concerted effort to get to the bottom of this can of worms once and for all, Dave Hostetter, Britt Rossi, James Hooks (Lumberton, SC), and Gary Lazich (Jackson, MS) agreed to serve on the committee.

The committee has been instructed to

Things Are Definitely Different Around Here...

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

Twenty years ago in Miami at SEPA 1975 I was the planetarium equivalent of a New York tourist who gets the roof of his mouth sunburned from staring at all the tall buildings with his mouth open.

My best memories were of collections of astronomy activities, new techniques for teaching difficult concepts, and Jack Horkheimer s technically unsophisticated but absolutely captivating star shows. I learned communicating with an audi ence could be accomplished by telling an engaging story no matter how many bells and whistles your star theatre had or didn t have. The registration fee for Miami was $15 and covered almost every meal. Wow!

In 1995 I learned we re concerned more and more with how to impress an audience and less and less with how we can teach them. I saw ~~commercials~~ presentations of electronic gizmos and show kits I will never be able to afford with a school system planetarium s budget.

If only I had lots of money at my dis posal, I wouldn t have to know anything about teaching astronomy. I could just buy prepackaged words, music, and sound effects and install electronic fireworks to numb the senses of my audience instead of expand their minds.

Thanks to all who submitted material to this issue of Southern Skies. I espe cially appreciate the scholarly articles that remind me of what SEPA used to be 20 years ago an organization of educators

President's Message continued

start with a clean slate, consider how best to structure the membership, and develop a plan that is the most beneficial to SEPA, takes into account the various concerns, and is as fair as possible. Over the next several months, the committee will review the bylaws and membership structure of other planetarium and professional orga nizations. They will solicit the opinions and concerns of SEPA members, other planetar ians, and the vendors.

If you have something to say, now is the time. Be brave enough to put your thoughts in writing. If you have concerns or complaints, then by all means, express them. Don t just gripe about injustices or unfair advantage. I challenge you to rec ommend solutions and alternatives. You can send your comments to me or directly to Mike Chesman. I strongly urge you to include information so the committee can contact you if they have any questions.

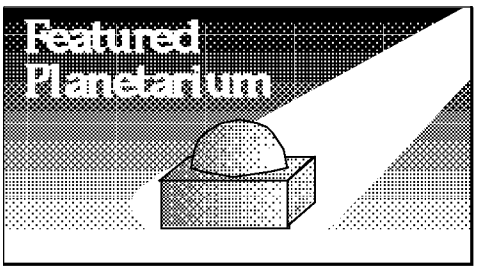
Watch the next two or three issues of Southern Skies as the committee develops a plan. I sincerely hope the committee, the SEPA Council, and all of the SEPA member ship can resolve this matter so that we can devote our time and energies to some more important things.

Overall I think the business meeting went pretty well. One colleague did com pare me to Newt Gingrich based on the manner in which I pushed through the items on the agenda. We were a bit rushed because we were behind schedule, and I was trying to make up time. To anyone who might think I cut off the discussion of the bylaws change before everyone had a chance to voice their opinion, I apologize. That was never my intent. That whole is sue is open for debate; so, speak now, or forever hold your peace.

Once again, SEPA had another great conference. This was my twelfth (scary thought), and I look back fondly at all of them. I particularly enjoy seeing old friends and making new ones. I am nervously an ticipating next year s meeting in Nashville.

Planetarium at the Edge of the Universe
Richmond, Virginia

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



Mike Cutrera

Jane Hastings
Author
Thomas Jefferson H.S.
Richmond, VA

My planetarium has no name. It s at Thomas Jefferson High School, so some times I call it Jefferson Planetarium, but officially, it has never been named. You see, there are two planetariums in Rich mond, mine and the Digistar driven 300 something seat theatre at the Science Museum of Virgina. As such things happen, we are 15 blocks from each other (I was here first!) and their star/ Omnimax theatre is called the Universe, so mine is The Planetarium at the Edge of the Universe!

A wave of planetarium construction nationwide occurred in the late 60s and early 70s. The Russians put Sputnik into space in 1957. America got nervous and dumped a whole lot of money into education. My planetarium was built with NDEA money at a cost of around $10,000 (dome $5000, projector $5000).

The cost of the building? Zero dollars. My planetarium may be the only one in the country installed in an existing room. Rich mond Public Schools had one classroom with an 18 ceiling that would just allow a small dome to fit inside. I m always amazed at the genius who visualized a planetarium in this peculiar room!

You must see it to understand: a room all by itself, set on top of a basically rectan gular high school building. On the facade of this room are four (count em, four) busts of Thomas Jefferson whose drapes dribble down the front of the building. A clock sits embedded in the limestone above the busts. The exterior limestone decreases above these busts in a ziggurat design ending with a metal vertical rod extending skyward. (An eagle used to be on top of that, but lightning took him away). Behind all this architectural embellishment is a room, once used as a classroom.

There are tall windows on the other three sides of the room, but they were painted black when the planetarium ap peared. In 1969, one 20 fiberglass dome, 34 semi concentric seats (facing the steps), one Viewlex (Goto) stripped down Apollo model (no automation), and one slightly bewildered Earth Science teacher were set down in this room to do something with this planetarium.

I have a bit of attachment to this plan etarium. Some previous references are to my planetarium, and mine was here first. I m that Earth Science teacher, the only person who s ever worked here! This is my 25th year in the planetarium not only in the profession but also in the room!

The planetarium is used exclusively during the school day by students in Rich mond Public Schools. There are currently no public programs, but some community groups arrange special programs. The original projector is still in use, enhanced by some auxillary slide projector and tape automation controls provided by East Coast Control Systems. A videoprojector, a laserdisc, and a VCR complete the set.

Lessons have changed through the years but reflect the current state guidelines for each grade level. Third graders get a two part lesson on 1) rotation of the Earth and 2) planets; fourth grade teachers choose between Seasons and Indian Sky Lore; fifth grade teachers select either Night Sky (Constellation ID) or Solar System. Sixth graders have a lesson on Phases of the Moon, and ninth graders see The Universe from Planets to Galaxies.

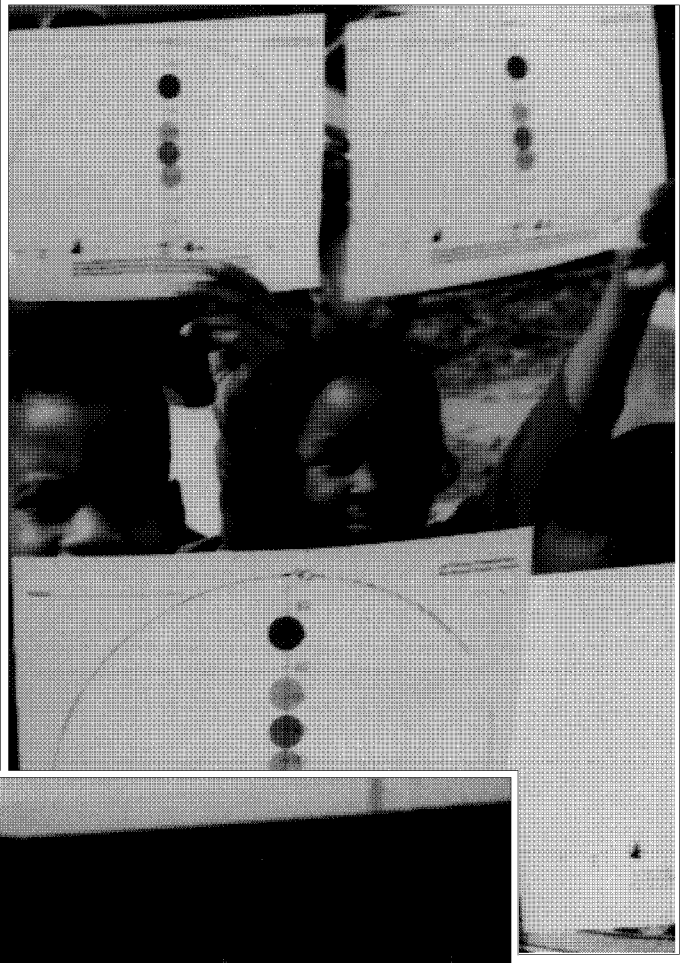
Next school year, I plan to add another 5th grade lesson called Columbus Finds America (celestial navigational aspects of the voyages of Columbus), and I plan to replace the planet portion of the 3rd grade lesson with a mini lesson on The Drinking Gourd (the Big Dipper).

I teach a high school Astronomy class also, utilizing the planetarium. I love what are called participatory programs. Stu dents do something in my lessons keeps them awake and really is more fun for me. My attendance figures will not seem very impressive, but please remember that they come one class at a time. In the 25 years of planetarium operation, 270,000 people have been to the planetarium, an average of almost 11,000 a year. During 94 95, a total of 9,700 people climbed up four flights of stairs, each a little breathless as they approached the wonders at the Edge

Left: Thomas Jefferson High School—home of the Planetarium at the Edge of the Universe

Below: Students compare their predictions (dots) of the noon altitude of the Sun, made in the Planetarium, with the altitude of the Sun outside. They proudly display their *good* predictions.

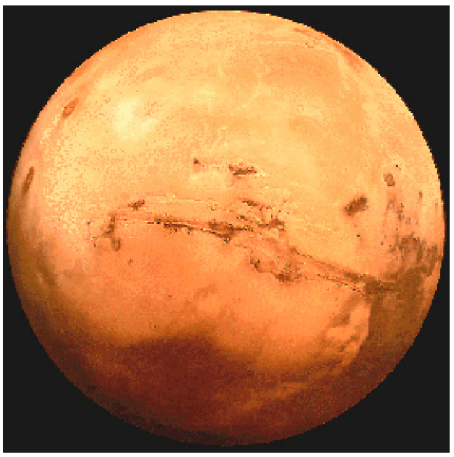
Bottom: Students model the phases of the Moon using a central light as the Sun, themselves as the Earth, and styrofoam balls as the Moon.



Mythology of the Moons of Pluto, Mars, and Neptune

Dennis J. Cowles
Louisiana Nature Center
New Orleans, LA

Well, this is it. In the interest of com pleteness, I have decided to do this final article covering the mythology of the solar system s moons. I have not, and I do not intend to, cover the planet Uranus. Those moons are named after characters in Pope and Shakespeare. If you wanna know, read em yourself! The only reason you might hear from me again on this topic in the pages of Southern Skies would be if I were to turn up something on the moons that I didn t uncover previously. Don t hold your breath!



Pluto is the Roman name for the Greek god Hades, ruler of the Underworld (called Tartarus). Cha ron was the boatman who ferried the souls of the dead across the River Styx on the way to Tartarus. Charon charged for this service, and this is why the Greeks placed coins in the mouth or over the eyes of the recently departed (this was very common among early cultures). Charon was supposed to take only the dead across the Styx, but one time he took a living person across Heracles.

Heracles was assigned the task of cap turing Cerberus, the three headed dog that guarded the gates of the underworld, as his twelfth labor. The only way to get to Cerberus was to cross the Styx. So Heracles intimidated Charon into giving him passage, so he could steal Hades pet, which he did. Hades became enraged at the theft, but, since he couldn t retaliate against Zeus fair haired boy Heracles, he took his wrath out on poor Charon. He had Charon confined in chains for a year for taking Heracles across the Styx.

Phobos and Deimos are the sons of Ares (Mars, the god of war), and Aphrodite (Ve nus, the goddess of love). Aphrodite was married to Hephaestus, the lame smith god, but Aphrodite and Ares carried on a rather torrid affair anyway. They continued their trysts until they tarried too long at Ares palace one morning. Helios the Sun god spotted them and promptly reported them to his friend Hephaestus, who de vised a plan to catch them. Hephaestus went to the forge and crafted a net of the strongest bronze. He placed this net stra tegically on the marriage bed, and told his wife that he was going on a vacation. No sooner was he out the door than Aphro dite sent for Ares. Soon they were at their sport, and became hopelessly entangled in the net. Hephaestus surprised them thus entangled, and called for all of the gods and goddesses to come witness his shame.

Hephaestus made a bunch of racket about the affair, but he really had no inten tion of ever divorcing Aphrodite. He was too much in love with her (as was every other god). And after all, she was the goddess of love, and who can blame her for doing what comes naturally to her? Phobos and Dei mos also have a sister named Harmonia, so we have a name ready should we find another moon in orbit around Mars.

Neptune is the Roman equivalent of Poseidon, god of the sea. All of the moons are named after characters connected with him or the sea, as you can well imagine. The naiads were the daughters of Danaus, ruler of Libya. His brothers were Aegyptus, for whom Egypt is named, and Cepheus (a name and myth planetarians should already know). There were altogether 50 naiads, born of various mothers. The nereids were the attendants of the sea goddess Thetis. All were mermaids, and all were the daughters of Nereus and the nymph Doris.

Triton was the son of Poseidon and Amphitrite, and is normally depicted as a merman, human male from the waist up, fish from the waist down. Triton possessed a seashell that, when blown, could either raise or calm the waters.

Despina was the daughter of Poseidon and the goddess Demeter. To avoid the attentions of both god and titan, Demeter turned herself into a mare and hid with the herd of Oncus (a son of Apollo). Poseidon saw through this ruse, changed himself into a stallion, and took her. From this union were born both Despina and the

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Rocks from Mars?

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This article is the result of a conversation with Todd Slisher at the 1995 SEPA Conference in Macon. We debated whether SNC meteorites were in fact from Mars. I decided to put my arguments in writing.

Stony meteorites are divided into two broad categories: chondrites and achondrites. Chondrites contain little spherical inclusions called chondrules. Finding chondrules in a rock is an easy way to determine whether a rock is a meteorite, because terrestrial rocks do not have them.

Chondrules can be modified by thermal or chemical conditions present throughout the history of the meteorite; they give us information about the history of the solar system.

Chondrules have nearly the same composition as the Sun, minus the hydrogen and the helium. We believe chondrules represent condensed portions of the original solar nebula. About 85% of all known meteorite falls are chondrites.

The other, much rarer, types of stony meteorite are collectively called achondrites. Achondrites are believed originally to have been chondritic, but the chondrite structure was destroyed during the process of planet formation. Achondrites show evidence of past melting and recrystallization.

They have a very coarse crystal structure and are more like terrestrial igneous rocks than like other meteorites. Among the stony meteorites, achondrites make up only 7% of known falls. Achondrites are subdivided into various classes, but the ones of interest to us here are shergottites, nakhlites, and chassignites, or collectively, the SNC class.

SNC (pronounced snick) meteorites are very similar in terms of their chemistry so similar that meteoriticists think they all came from the same parent body. All SNC meteorites are cumulate rocks; they formed from the accumulation of material.

The minerals found in them indicate a volcanic origin. They have large crystals of plagioclase, pyroxenes, and olivine (the three most common planet forming minerals).

SNC achondrites have interesting and unique properties. They're the only achondrites that contain water, and they also contain chemicals that demonstrate the presence of water during their formation, i.e., metallic oxides.

Using isotopes to date the SNCs, scientists discovered that some formed 180 million years ago, and some formed 1.3 billion years ago. By counting cosmic ray tracks present in the rocks, one can determine how long a given meteorite has been floating in space (its exposure).

Meteorite types are named after the most representative specimen or the first known occurrence of the type. Shergottites are named after a meteorite that fell near Shergotty, India in 1865. Nakhlites are named after a meteorite that fell in Nakhla, Egypt in 1911 (and reportedly killed a dog). Chassignites are named after a meteorite that fell in Chassigny, France in 1815.

SNCs show two different exposure ages, either 15 million years ago or 180 million years ago. But we are now left with a bit of a puzzle. The facts are as follows:

1. SNCs contain water.
2. They are young compared with other meteorites and Apollo lunar samples.
3. They were not in space for long.
4. Wherever they come from must have had enough heat to produce volcanoes as recently as 1.3 billion years ago.

By comparing the ratios of isotopes in SNCs, scientists have determined that SNCs did not come from the Earth. So,

5. They are not from here.

Where did they come from? From our next door neighbor, Mars.

Mars is the easiest explanation for a source for SNCs. We know there was water on Mars in the past. Mars shows evidence of widespread vulcanism, and vulcanism was probably occurring on Mars until

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Where Does the Moon Go? and Can You Find a Planet?

Patrick McQuillan
Book Review Editor
Alexander Brest Planetarium
Jacksonville, FL

Hello fellow SEPAites! I hope everyone has recovered from the conference in Macon, Georgia. I know I haven t. I m ready for another one. With that in mind I decided to pull out and read some space books for the younger visitors that I had on my shelves. These two books are great for adding to a workshop if you need a fun sit down and relax activity for the hyper, uhm enthusiastic, yeah that s it, enthusi astic members of your workshop. The two books are on the 2nd to 4th grade level.

Where Does the Moon Go? follows the Moon through its 28 day trip around the Earth and, along the way, identifies what causes the different phases of the Moon. This book is written for budding young astronomers who want to learn more about the barren, cratered world that is our clos est neighbor.

It is one of a series of books written by Sidney Rosen and illustrated by Dean Lindberg. It is important to mention both the author and the illustrator, for without both this book would not be one tenth as enjoyable. The illustrations really make this book one that kids will pick up and read again and again.

The book is written in a question and answer format that starts with Will the Moon be up tonight? This starts the young reader thinking about the Moon and the sky. The narration proceeds to answer the questions and, before the book has ended, gravity, the Moon s environment, its phases, and many other topics are unraveled in easy to understand terms.

Lots of colorful cartoon drawings are either overlaid on real photos of rocket launches, the various Moon phases, or night sky pictures; or a page just has a cartoon drawing on it that helps explain the topic or infuse some offbeat humor. The characters in the book include a boy with a backpack (who I guess is asking all the questions), his dog (who is also wearing a backpack), and an owl with binoculars (who apparently is answering all the questions).

If you want a fun book to use as a reading activity for a second or third grade workshop, this book will catch the children s interest. It may even catch your interest. Doesn t everyone like to read a book with lots of pictures and cartoon characters? I know I do.

Can You Find a Planet? is yet another in the series of question and answer books written by Sidney Rosen and illustrated by Dean Lindberg. And once again they have created a wonderful mix of cartoon drawings and actual photos. This book focuses on planets.

Through the course of the book, read ers are taken on a fast rocket tour of the planets. The book begins by looking at the night sky from our vantage point on the Earth. It explains the difference between planets and stars, how we can see more with telescopes and space probes, and then looks at the planets up close.

The boy and his dog are back asking questions again, but this time the an swers are given by a woman (an astronaut maybe.) She pilots the rocket that zips the characters around the solar system. (Besides, everyone knows owls can t pilot rocket ships.) My only complaint is that the boy and his dog are never given names in any of the books. I guess Mickey and Pluto would be just too cliché.

One particularly good feature of all of Rosen s books is the glossary. Any big word is highlighted in bold print and defined in the back of the book. The definitions make big words (like planetarium, constellation, and astronomer) easy for young readers to understand.

Probably the best part of the book (and the part that shows my bias) is the part where the boy asks How can I spot a planet in the night sky?

Part of the answer is, Your local plan etarium can tell you where to look for planets. It never hurts to have kids read a book and then bug their parents to take them to the planetarium.

(continued on page 18)

Where Does the Moon Go?

Written by Sidney Rosen
Illustrated by Dean Lind- berg

Can You Find a Planet?

Written by Sidney Rosen
Illustrated by Dean Lind- berg

Reviewed by
Patrick McQuillan
Alexander Brest Planetarium
Jacksonville, FL

Small Talk

Betty Wasiluk
Small Talk editor
Berkeley County
Planetarium
Hedgesville, WV

Wow, I m glad the school year is over. What with teaching the three classes and running my humble amount of 1767 people through the planetarium (That s actually a lot of people at 25 a shot!) I am plumb tuckered out as my fellow West Virginians would say.

I wouldn t be able to get through the year if it weren t for my new planetarium assistants. And now in their own words, here is their version of how their first year went.

First up we have Matt Yost, who when not doing terrific special effects in the plan etarium, is usually running on Hedgesville High School s State Champion track team or the school s golf team.

> My experiences in the Hedgesville High School Planetarium have been indifferent over the course of the last year. Some days are very exciting, because this class is quite different from any regular class. It s been nice dealing one on one with Ms. Wasiluk; you can learn more that way. I enjoyed working with my fellow classmate and amateur astronomer Aaron Moats. The class could be made better if the equipment available could somehow be upgraded.
>
> I enjoyed helping out and doing various parts of the many programs that the HHS Planetarium has to of fer.
>
> This class was a great time just to relax and have some fun, unlike other classes in the building where teachers seem to take the fun out of learning. In the planetarium you can learn and have fun while doing so. I liked that.

Aaron Moats, who has done a wonderful program on Jupiter this year in the plan etarium, also is on that State Champion track team, the golf team, and the bas ketball team. He is the only planetarium assistant not to be back next year.

> Our audiences are small, our machines are ancient, our funds are dwindling, and our sanities are faultering. This is an accurate descrip tion of the Hedgesville High School Planetarium and its workers. The as sistants, Frank Aliveto, Matthew Yost, and I have learned how to run the pro jectors, how to make special effects, how to make panorama slides, and how to give a program. The classroom time is also great. We are one on one with Ms. Wasiluk. We don t have many tests. It is also the only class that I know of where the students can lie on the floor! I am glad that I took this class, but I am also glad that I am not taking it next year.
>
> Oh yeah, please send us some stuff! Anything will be greatly appreci ated! Thank you!

Finally I had to share the spotlight with football with Frank Aliveto. He too was on that award winning track team and just happens to be my boss s son.

> I am an advanced astronomy stu dent/ planetarium assistant under Ms. Wasilik s wing here at the Berke ley County Planetarium.
>
> This year is the first year I ve ever been associated with the in ner world of planetarium working, and let me say that it can be very stressful. Often those underpaid, overworked individuals who run the country s small planetariums are not given the credit they deserve. A small planetarium director s life consists of putting together masterful programs usually with equipment that is less than par or not enough for the task at hand. But I ll tell you one thing the patrons oohs! and aahs! make it all worthwhile. So remember this next time you re in a small planetarium, or any planetarium for that matter, and give the director (and his/ her assistants) a thank you and a pat on the back for a job well done.

Well, I m on hiatus for the summer. I ve received a travel grant for the Astronomical Society of the Pacific s Educational Sympo sium. Since it was offered at the same time

Next Step: Mars?

Mike Cutrera
Digital Cosmos Editor
Bishop Planetarium
Bradenton, FL

Mike Cutrera

Next Step: Mars? is a CD ROM for Ma cintosh and PC users based on the PBS series Space Age. With an introduction and numerous QuickTime movies narrated by Patrick, Captain Picard Stewart, Next Step: Mars? is an excellent tool for educa tors. It also offers several fun evenings of home use.

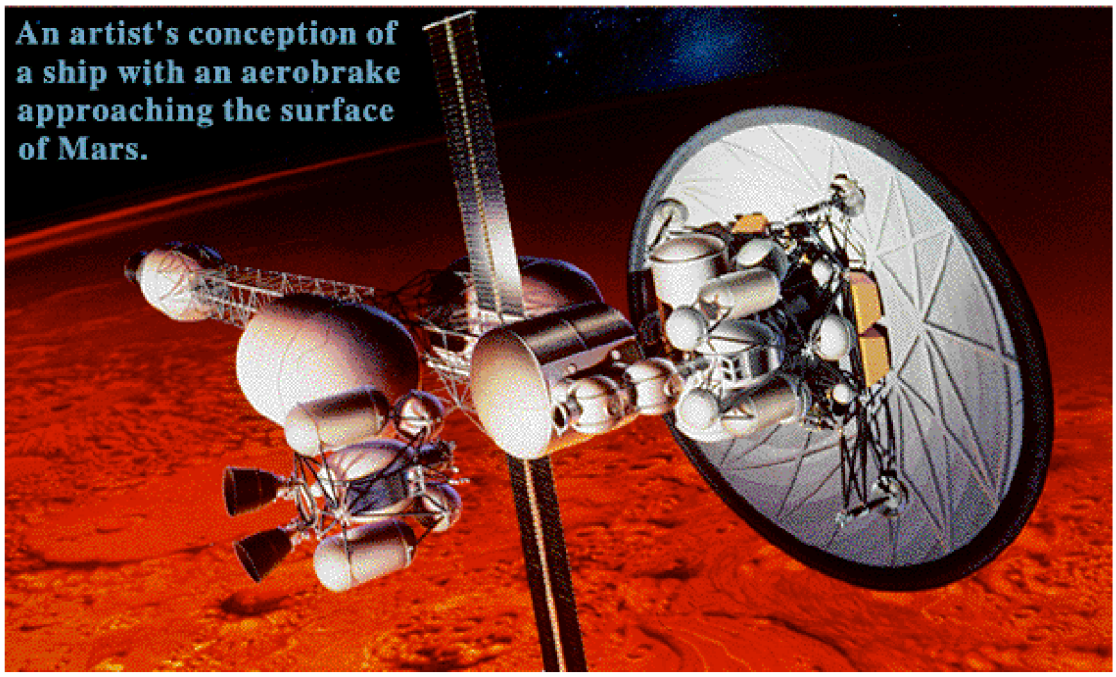
The user/ player is challenged by the alien but humanoid Mentor of the Village of Knowledge to make an important decision concerning the next step of space explo ration by the inhabitants of our planet. Should we Earthlings stop at our current level of space technology and be content to study the Earth and its environment? Should they explore other planets, viz. Mars, using robot probes with remote sen sors? Should we plan human expeditions to explore the planet? Should we colonize Mars and terraform it to serve as a human habitat?

You must examine an archive of infor mation about the Space Age on Earth and make several value judgments: Who played the biggest role in the development of the rocket? How inevitable was the Space Age? What s the best way to juggle the cost vs. benefits of space exploration? What is humanity s greatest challenge before go ing to Mars?

A 14 year old student tester listened to all the arguments from various minded Counselors, examined the Halls of Dreams, Adventure, Enterprise, and Challenge, learned all 12 passwords, and gathered all four artifacts indicating mastery of the subject in four hours over a two day period. It s possible, however, to quit an exploration in progress and resume it later. (In a classroom setting, exploring the four halls and performing the suggested extension activities could easily last two weeks in one hour segments.) The student also said he learned more from Next Step: Mars? than he would have from a text book, and he thought it was appropriate for 11 14 year olds.

Next Step: Mars? is a sufficiently chal lenging program that even those who are knowledgeable about the history and development of the Space Age will not be able to answer all the questions without doing some exploring. I especially like the emphasis on higher levels of learning. Stu dents must formulate their own opinions and make their own judgments about what they learn from their investigation.

The Next Step: Mars? CD ROM is avail able from IVI Publishing, 7500 Flying Cloud Drive, Minneapolis, MN 55344 3739. Con tact them at (612) 996 6000.


An artist's conception of a ship with an aerobrake approaching the surface of Mars.

Reviewed by
Duncan R. Teague
Craigmont Planetarium
Memphis, TN

Night Sky Interactive

Reviewed by
Duncan R. Teague
Craigmont Planetarium
Memphis, TN

A computer adage suggests you should never buy version 1.0 of anything. Version 1.1 of BeachWare s Night Sky Interactive CD ROM did little to improve the origi nal.

I purchased NSI for $14.95 from MEI Micro last spring. After spending a few minutes with the program, I called the de velopers to point out some glaring errors in the software. Then I contacted MEI Micro to exchange it for something useful.

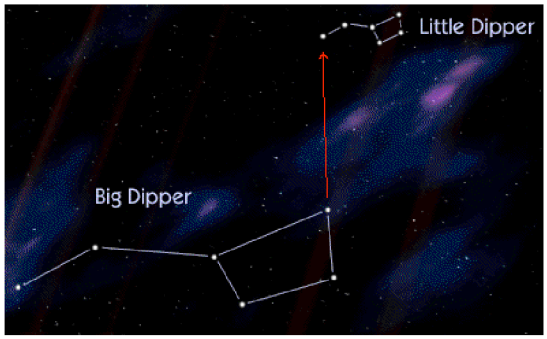
The most obvious problem with the first page of the first chapter of the CD was the statement that the Earth Sun distance is 9.3 million miles. Compounding the error in the on screen text was spoken confir mation by a narrator, identified in credits as a Ph.D., that the Earth was indeed less than ten million miles from its parent star. When I questioned the person who answered BeachWare s phone how a Ph.D. could possibly let such an outrageous error slip past his lips, I learned the narrator had a Ph.D. in zoology, not astronomy. I wondered if I were on Candid Camera.

I learned I was one of two individuals in the country to have discovered this problem, and I was promised a copy of the next version for my trouble. Version 1.1 has arrived. It has the correct Earth Sun distance, but nothing else has been fixed.

If I were judging ice skating instead of reviewing software, I would have to give NSI average marks for artistic impression but major deductions for technical merit.

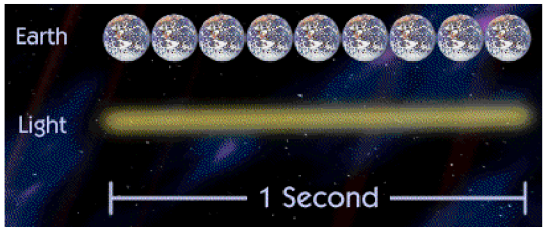
The package quotes a San D iego Union Tribune reviewer who proclaims NSI is One of the most entertaining CD ROM based astronomy programs I ve seen. I wonder if their reviewer is entertained by blatantly bad astronomy, typographi cal errors, typography errors, misspelled words, lack of subject verb agreement, split infinitives, and inconsistencies. The writer lacks understanding of the superla tive degree of comparison and when to use the subjunctive mood.

An animation uses Cassiopeia and the Little D ipper to demonstrate circumpolar motion about the North Star. The stars incorrectly move clockwise. Narration and a diagram explain how to find the North



Star by extending a line upward from the pointer stars of the Big D ipper. Extending a line upward from the pointer stars only works when the Big D ipper is below the Little D ipper. Star maps for the four sea sons and all four cardinal directions show all the stars the same magnitude.

A slide show used to explain what a light year is shows that a beam of light travels nine Earth diameters in one second. Light travels about 7.4 times the Earth s circum



ference in one second, but I can t find any dimension of the Earth light travels nine of in one second.

I fear the low cost and the attractive, well organized presentation of NSI will cause some to accept the misinformation contained in this CD ROM to be gospel. We have a hard enough time correcting misconceptions formed after reading material that is correct. We don t need seriously flawed software on the screens of the astronomically disadvantaged.

Night Sky Interactive runs on both Ma cintosh and multimedia PCs. It s $19.95 from Educorp. For a good look at bad

(Rocks From Mars? continued from page 6)

relatively recently.

When magma forms on Earth, dissolved gases in the rock get trapped within the crystal lattice as the rock cools. Do we see this with SNCs? Yes, and the gas composition and isotope ratios closely match what the Viking landers measured at the Martian surface.

How did they get off of the surface of Mars? Probably from the impact of a small asteroid.

When an asteroid hits, it throws tremendous amounts of target material into the atmosphere. Since Mars is a small planet, and thus has a smaller escape velocity, an asteroid of sufficient size (say 10 to 20 kilometers) travelling at sufficient speed (around 30 kilometers per second) can impart enough energy for Martian material to get into space.

Once there, it will orbit the Sun until perturbations maneuver it into an Earth crossing orbit. This would probably take several million years to happen, and this ties in with the exposure ages.

The impact of an asteroid will cause shock damage to occur in material ejected from the site. Do we see this in SNCs? Yes, the shergottites show both glass formation and shock melting.

Could SNCs be from the Moon? Highly unlikely, since the youngest Apollo sample has an isotopic age of 3.3 billion years. The SNCs are two billion years younger than that. Also, there is not enough water on the Moon to produce the chemistry seen in the SNCs. There is no evidence that volcanic activity was still occurring on the Moon as recently as 1.3 billion years ago.

Could they be from Venus? Probably not. They don t show the gases we would expect to be trapped in Venerian rock. The Magellan mission demonstrated that the surface of Venus is now very young maybe no more than 500 million years old so Venus may be ruled out as being too young to be the source.

What about an asteroid? Scientists think they are the source of most meteorites. But asteroids are not large enough to retain the heat necessary for vulcanism to occur as recently as 1.3 billion years ago.

We don t know yet whether asteroids have water (I suspect not.), and we don t know what gases may be trapped in asteroids.

Mars is really the only viable candidate for a parent body for SNC meteorites. It is known to have had the conditions we see in the SNCs: chemistry, mineralogy, isotope ratios, and surface conditions. Only with a sample return mission (or better, a piloted Mars landing) will we be able to say conclusively whether SNCs are Martian in origin. But the probability is quite high that they are.

SNCs (and other meteorites) lend themselves to use in a planetarium. Can you imagine the look on someone s face when they hold a small piece of another planet? Unfortunately, SNCs are very expensive, usually costing anywhere from $100 $500 per gram. (In 1993, gold cost $14 per gram!) I don t yet have a SNC in my rather modest meteorite collection, but I do plan to add one soon. If you are thinking about using meteorites in your planetarium, my advice is do it!

NSTA Decries Education

Cindy Steele
Public Information Specialist

The National Science Teachers Association (NSTA) voiced its strong concern for the future of education if Congress succeeds in slashing $4 billion from fiscal 1996 education appropriations. NSTA encourages teachers of all levels and concerned citizens across the country to contact their Representatives and Senators to voice their disapproval of these cuts.

NSTA s action comes in the wake of a recent vote by the House Appropriations Committee on Labor, Health and Human Services, and Education to reduce the amount Congress appropriates for education by 18% less than was initially authorized for fiscal 1995. Proposed cuts for all discretionary programs averaged only 3%.

Among other programs, the reduction would drastically reduce funding for the Eisenhower Professional Development Program and Title II by $167 million based on levels initially authorized for fiscal 1995. The Eisenhower program would be

(continued on page 17)

Late-Breaking Space Images on Your Dome

Richard McColman
Morehead Planetarium
Chapel Hill, NC

With the Hubble Space Telescope aloft and capturing new and important images on a daily basis, our astronomy knowledge is in a state of rapid evolution. Unfortu nately, few of these images ever make it to the eyes of the public via the major media outlets. While planetariums traditionally have been able to show visitors recent as tronomical finds, there has typically been a delay of weeks, months, or longer from the release dates of images until we can get our hands on them. Happily, this is no lon ger the case. With the advent of personal computers and high speed Internet com munications, it s possible for planetariums to display late breaking and important astronomical images within hours of their release. In this article we ll briefly outline a quick and dirty (and inexpensive) method to place new Hubble and other space im ages before your audiences.

What You ll Need

There are a few prerequisites for the rapid display of astronomical images on your dome. They are the following:

1. A computer with a good processor clock speed, a hard drive, and at least 4 megabytes of RAM. This is necessary to handle the graphics files themselves plus the software needed to download and view them.
2. A fast modem for connection to a suitable electronic online service at high speed. High speed communi cations are important for graphical files which are generally quite large, and will consume lots of online download time (and in the case of commercial online services, lots of money) if connections are made at slow modem speeds. At a speed of 28,800 bps, the typical Hubble graphic will take less than two min utes to download, and only about twice as long at 14,400 bps. The same images downloaded at 2,400 bps can take the better part of a half hour each! Since high speed modems are becoming less and less expensive nowadays (The typical 14,400 bps unit can be bought for less than $100.), it makes sense to upgrade. (Note: PC users looking to upgrade to a high speed external modem must be sure your serial port UART chip can handle high speed communications reliably. Otherwise, you ll either have to upgrade your serial card to a high speed version as well, or stick with an internal modem, which has a built in high speed chip.)
3. A color monitor which, for our cheap and dirty image capture, should be of fairly decent resolu tion. Typically, a 14 inch monitor with a dot pitch of 0.28 or less and capable of displaying at least 256 colors should do nicely. You can use lower resolution monitors, but you lose quality in the displayed images.
4. A bulletin board service that has a good Internet access gateway, including FTP (file transfer proto col).
5. Software for communicating with an online service and displaying the more popular graphics file formats. You can often find and download shareware graphics display soft ware from your online service.
6. Camera equipment, including a 35mm SLR with manual exposure and a sturdy tripod to capture images off the computer monitor. These items are necessary for final conversion of the electronic images into slides. Computer users can readily obtain very high quality computer to slide conversions by taking electronic files to a service bureau. The cost is typically $5 $15 per slide, and it usually takes a few days to get back the finished slides, (unless you pay additional rush charges). Shooting images directly off a computer monitor yields resolutions lower than that obtainable by film recorder technol ogy at a service bureau, but it is an acceptable alternative for display ing late breaking space images on

your dome particularly if you have a good quality color monitor from which to shoot.

Making the Connection

The first procedure needed to display space images on your dome is to download them from your online service. A few of these services, such as America Online, have their own areas with astronomy information, including image libraries. These services often update these libraries with the latest releases only on an occasional basis, so you may not be able to get the newest images until days or weeks after they're released. In addition, these internal libraries will usually have only a relatively small number of the total images available from Hubble or other spacecraft missions. The solution is to use the online service's Internet link to access image files from more extensive libraries.

One of the best places to access Hubble images, for example, is to perform an FTP, or file download, from the Space Telescope Science Institute, whose Internet address is stsci.edu. Once you've connected there, look though their directory structure for a subdirectory called stsci/epa/latest. There you can get to some of the most recent Hubble images and download them. (Older Hubble images can be downloaded from other subdirectories within stsci/epa.) Often, you'll find that filenames at FTP sites are rather cryptic and a bit difficult to decipher at first. To obtain more complete descriptions of files and their contents at a given Internet site, find and download a more detailed file index. Look in the site directory for one.

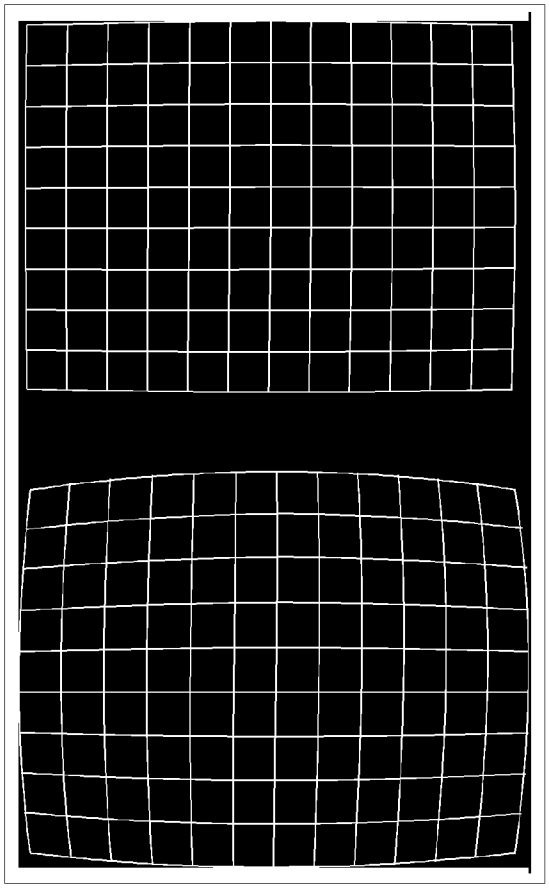
An easier way to get images is through the World Wide Web, or WWW. This type of connection allows the user to avoid the cryptic Unix commands typically required by most conventional Internet sites and, instead, access a Mac or Windows like graphical user interface to get information. The Web also facilitates easy connection to other Web sites having similar subject matter and interests. Connection to the Web does require special software and support capabilities through your online service, so you'll need to investigate these options before accessing it. For information on connecting to the Web as well as conventional Internet access, there are lots of good books available nowadays. Just browse through your local bookshop.

Let's assume that you've downloaded some image files and you want to display them. The next step is to load your image viewing/manipulating program and open the file(s) you've just downloaded. (It's important to note here that your program must be able to handle the image formats you've downloaded usually GIF or JPEG. If your software won't display those formats, locate one that does. Shareware programs are available that will do the trick, and they usually have low registration fees.) If you have a photo painting, or other image manipulation program, you can crop, paste, or otherwise edit the images for your specific purposes.

Camera Procedures

The final procedure before displaying these space images to your audiences is to photograph and develop them. There are a few important rules to keep in mind when capturing computer images on slide film.

First, use daylight film. Film balanced for tungsten or incandescent light will give



images a decidedly blue cast. An ASA/ ISO around 200 should put you in the ballpark for dealing with the monitor s light levels.

Second, adjust brightness and con trast on your monitor for average to slightly higher than average brightness, but slightly lower than normal contrast. Photographing off a monitor tends to build contrast in the resulting image. This procedure will let you retain more detail in both the darker and lighter areas of the slide images.

Third, choose a camera shutter speed which will eliminate the scan bars often seen when a TV screen or computer moni tor is photographed. Simply choose a slow shutter speed around ½ 1 second. This lets the monitor scan the image multiple times during the exposure and will effec tively cancel out any partial scan effects typically seen with short exposure times.

Next, use a longer than normal focal length lens on your camera say, in the 100 200mm range. Doing so will let you place the camera farther from the moni tor, and will tend to minimize the bowing effect you get photographing a curved screen at close range. Figure 1 simulates the effect of parallel horizontal and vertical grid lines photographed with a long lens, while Figure 2 depicts the grid shot with a 50mm lens. This bowing effect is less pronounced on some of the newer flat screen monitors.

Set up the camera and tripod so as to fill the camera frame without cropping any needed image information. You may find the left and right sides of the monitor s plastic screen frame are visible through the camera. You can eliminate these by taping strips of black construction paper verti cally over the left or right sides of the moni tor screen frame. Make sure to position the camera perpendicular to the monitor screen. This will minimize any additional image distortion during shooting.

Meter with the camera off an average image one with lots of medium intensity tones, or roughly equal amounts of light and dark areas. While camera meters are adjusted for these sorts of average scenes, most astrophotos and other space images have a disproportionately large amount of black, which if used as the meter stan dard image, will cause the slide to come out overexposed. Once you ve metered off your average image, maintain that exposure standard despite what the me ter indicates on the other images. When shooting your first roll, take bracketed exposures one stop above and below the metered standard for each image, in case your average reference image is a bit light or dark overall. Take notes, and compare these to the developed results to determine the best exposure settings for future off the monitor shoots.

Make sure the final exposure settings provide you with an aperture at least a couple of stops closed down from wide open. This will give you adequate depth of field and ensure the slides are sharp from edge to edge. If you have to adjust your camera aperture, compensate by adjusting the shutter speed as well, to maintain a good film exposure combination.

Finally, make sure to eliminate any extraneous room lights that can reflect off the monitor screen. If you re working in a room with no windows, simply turn off all the lights and close the door. If you have windows, you may have to hang black paper or cloth over it, or, alternatively, wait until nighttime.

Following the preceding steps will give you the ability to capture and display late breaking space images in your planetari um during either your constellation show or other programs. Audiences really enjoy

Service Bureau Rebuttal

I have shot slides from original artwork, models, and a monitor. I ve wasted film and, more importantly, my time adjusting lights and bracketing exposures to get 12 excellent images out of 36. I think a charge of $2.50 5.00 per slide from a service bureau is reasonable. And now I are one.

With my film recorder I get great im ages. The color of a grey asteroid is truly grey, not blue grey or green grey. It s dif ficult matching the color temperature your monitor radiates with the color for which your film is balanced. There s just no substitute for having the right tool for

Duncan Teague
Craigmont Planetarium
Memphis, TN

News from SEPA States

Michael Sandras
Freeport-McMoRan
Daily Living Science Center
Kenner, LA

Freeport McMoRan Planetarium and Observatory, Kenner

This summer we are presenting The Sky Tonight, Summer Colors, Daughter of The Stars, Moon Witch, and several customized school programs. Progress continues on the Martin Marietta Space Station Mock up with November 1995 still the planned opening date. This summer the Planetarium will be working in conjunction with the University of New Orleans in helping with their Space Quest program. In the past this program has presented to young people many aspects of astronomy and related aerospace activities.

The big news is the Kenner City Council has approved initial funding to begin work on the planned 50 planetarium/film theater facility. Obviously this project will be taking up a lot of my time over the next couple of years. When completed this will be the largest planetarium in Louisiana. Monies have also been allocated to expand the current planetarium s capabilities. Needless to say I have nothing bad to say about any Kenner elected official!

Louisiana Nature and Science Center Planetarium, New Orleans

Mark and Dennis are busy producing the Queen Laser Show. The new show will premiere in August, and join the other laser shows in regular rotation: Dark Side of the Moon, the Best of Pink Floyd, Metallica, Rush, Aerosmith, and Led Zeppelin. The Alternative Laser Show has been temporarily pulled from the rotation because of some question about the appropriateness of certain lyrics in the show, most notably the song Closer by Nine Inch Nails. If you ve heard the song (not the broadcast version, the real version), then you know why! For the public, they are showing Planet Patrol, The Sky Tonight, and the Oldies Laser Show on weekends. They report that attendance has increased considerably for public shows since the merger with the Audubon Institute last October.

By summer s end, there should be a homepage on the World Wide Web. Look at the Astronomical Society of the Pacific s homepage under Planetarium at http://www.physics.sfsu.edu/edu/asp/asp.html. They ve been net surfing like crazy, and some of you have weird email messages to prove it especially from Dennis!

Dennis is revamping the filing system for slides, and Mark reports the voice mail system is now completely operational. Call 504 246 STAR, or 246 RUBS, or BIO PUBS.

Plans call for a new laser show this fall.

St. Charles Parish Library Planetarium, Luling

Gary Meibaum says construction continues on the expansion of the library next to the planetarium. Gary and his patrons are forced to endure this for several more months. In the meantime Gary continues to present The Cowboy Astronomer as well as several educational programs. This facility is also offering a free community education course on Astronomy.

Lafayette Natural History Museum Planetarium, Lafayette

Dave Hostetter is still in facility limbo. Due to actions of the local government, the future of the facility is in question. There are plans for a museum move but the scenario for the planetarium still isn t certain.

Dave continues to do his best by giving presentations in both classrooms and with a Starlab. Plans continue to showcase the Russian space program in an upcoming Russian cultural program being presented in Lafayette early next year.

Louisiana Arts and Science Center Planetarium, Baton Rouge

David Mayeux reports that the LASC s current public space shows are Tales of The Night Sky and The Voyage of Endeavour! Then and Now. These programs will be presented through August. Public stargazes are still being held once a month. David also reports that the Baton Rouge Astronomy Society is still opening the Clark refractor at nearby LSU for the public. David and his wife Melanie will also be presenting several space talks at local libraries as well.

Russell C. Davis Planetarium, Jackson

Russell C. Davis Planetarium in Jackson is offering a summer smorgasbord. Planetarium programs include Hansen Planetarium s Cosmic Catastrophes and Northern Lights Planetarium s Arctic Lights, which includes spectacular time lapse hemispheric film of the Northern Lights, the midnight sun, and life in northern Norway. (If you ve never seen the Northern Lights, this film will show you what you ve missed!) The laser/ light show menu includes Good Times, Bad Times (Led Zeppelin), The Dark Side of the Moon (a Davis original), and Bright Lights, Big Country (the first laser feature produced in Jackson). Backyard Astronomy classes, showings of The Space Shuttle: An American Adventure, and a special Space Day on July 22nd completed the summer. (The Student Space Station™ program and facilities are undergoing refurbishment.) In September Fleet Space Theater s To Worlds Beyond will premiere in Jackson along with a return engagement of Larry Cat in Space accompanied by The Magic Egg.

The SEPA goals we sent to the State Department of Education appear to have had some effect despite my inability to verify that effect. Our actions coincided with the arrival of a new science coordinator (position and employee) at the State Department of Education as well as with initiation of a project to establish a framework for science education in the state. I called the coordinator and asked him to keep me informed on the status of the project and send me drafts of the astronomy sections for review. He said that he would but never did and I let more immediate Planetarium tasks divert my attention. Finally, two months ago, I learned from our district science supervisor that the Department had already issued the published framework and obtained a copy from her.

The framework emphasizes use of the scientific method at all levels. On the balance astronomy fares fairly well. The curriculum covers virtually all of SEPA s goals with one or two curious omissions. I couldn t find any explicit objective on Moon phases (although the fourth grade curriculum includes the interactions of Earth, Sun, Moon, and planets). Nor could I find any explicit distinction between astronomy and astrology.

My greatest concern involves the lack of any focus on spaceflight and its benefits, a curious omission given the presence of the Davis Planetarium and the NASA Stennis Space Center in Mississippi. In fact, these facilities do not even appear in the resource sites or the acknowledgments. (Neither does SEPA.) An examination of the university and college professor network listing may provide a clue. The listing includes some 150 biology professors but only 3 astronomy professors. (This may explain why the standard high school science sequence includes two years of biology, a year each of chemistry and physics, and no earth science.)

The curriculum does include a new high school astronomy course! In fact, our district has scheduled that course for three of their high schools and wants to work with us to develop laboratory exercises for the Planetarium. I ll keep you posted on our progress.

Gary M. Lazich
Russell C. Davis Planetarium

Rainwater Observatory & Planetarium, French Camp

The Rainwater Observatory and Planetarium in French Camp is providing spectacular views of Jupiter through its refurbished 20 Dobsonian reflector. A new 6 refractor is on order. The computer controlled Meade 12 LX200 is performing flawlessly, enabling rapid access to deep sky views for visiting groups. The planetarium, which should be fully operational by fall, will include a new floodlit revolving display case for meteorites courtesy of a local pharmacy which no longer needed it to display watches!

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consolidated along with 11 other education programs into block grants to states, thus jeopardizing the priority for funding professional development for science and math teachers.

The Dwight D. Eisenhower Mathematics and Science Education Program of the U.S. Department of Education is designed to improve the skills of teachers and the quality of instruction in science, math, and other core subjects in the nation s public and private elementary and secondary schools. The primary focus of the Eisenhower program is support for inservice teacher training. One third to one half of the nation s science and math teachers benefit annually from Eisenhower funds.

(NSTA Decries Education Cuts
continued from page 12)

Woodson Planetarium, Horizons Unlmit ed, Salisbury

Cyndi Zeger says Woodson Planetarium is providing programs for a variety of camps and local groups. Shows include Bear Tales, Welcome to the Universe, and a new inquiry activity on seasons.

Cyndi Zeger
Woodson Planetarium
Salisbury, NC

Horizons Unlimited is also exhibiting 30 original paintings of space phenomena by artist Sam Bissette. The paintings are part of the collection we saw at Discovery Place during the 1994 SEPA Conference last June.

Patsy Wilson, Health Educator at Ho rizons Unlimited will be the planetarium contact beginning in August. Patsy will continue to coordinate the programs in the Learn and Live Health Museum as well as overseeing and implementing the program ming in the Woodson Planetarium.

Kelly Planetarium, Discovery Place, Char lotte

Sue Griswold reports Kelly Planetarium at Discovery Place has opened the summer ONMIMAX show Grand Canyon. The show is a true life adventure show of experiences in the Grand Canyon from the year 2050 BC to the present time. The most animated 3 D laser show, Space Warp, opened for the summer in June.

Morehead Planetarium, Chapel Hill

Lee Shapiro says the Moorehead Plan etarium is running a variety of shows this summer including Summer Night Flight, Journey By Starlight, Sky Rambles, Orion Rendezvous and The Little Star that Could. Special classes include the Outdoor Solar System and Far and Small.

A summer camp, Starbase Morehead, conducted with the Museum of Life and Science is a hands on camp where elemen tary and middle school students can learn the fundamentals of astronomy and space exploration.

Schiele Planetarium, Gastonia

James Lynn, Director, and Steve Mor gan, Assistant Director, tell us the Schiele Planetarium is serving both the general public and local day camps with summer programming. The movie featured in the Cinema 360 is Another Day, a stunning vista of the great American Southwest. The featured planetarium show is The Endless Horizon, a show highlighting periods of exploration that shaped our view of the world.

SciWorks Planetarium, Winston Salem

Duke Johnson reports the Sci Works Planetarium is running weekend laser shows from now until eternity, had its second Concerts under the Stars series in June, and has recently opened its version of the Galaxies show by Hansen. Planet Patrol is the featured summer show. In house camps where students learn the wonders of the sky and the sky highlights of summer run through July

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(Mythology of the Moons of Pluto, Mars, and Neptune continued from page 6)

wild horse Arion.

Proteus was shepherd of the sea, and a prophet to boot. But this prophet didn t like to reveal his knowledge, so any wish ing to consult with him had to capture him while he was asleep and bind him securely.

When he woke up, Proteus would change from one form into another to try to escape. If this failed (or when he got tired), Proteus would return to his normal shape (that of an old man) and answer questions. After answering the petitioner, he would flee into the sea.

Galatea was a creation of the goddess Aphrodite. A fellow named Pygmalion was madly in love with Aphrodite (and who wasn t?), but she refused to yield to him. (Gods drive cooler cars than mere mortals, they don t have a curfew, and they don t have to ask their parents for money.)

Pygmalion carved an ivory image of the goddess and prayed for her pity. She heard his pleas, entered the statue, and brought it to life as the beautiful Galatea.

Galatea has the same source as our

Where Does the Moon Go? and Can You Find a Planet? continued from page 8)

Lost Moon: The Perilous Voyage of Apollo 13 by Jim Lovell and Jeffrey Kluger has been retitled Apollo 13. It is available from Simon and Schuster Inc., New York, NY 10020, ISBN: 0 671 53464 5, $6.50. I guess this was to avoid confusion, now that the movie version of the book is out.

By changing the title the publishers have avoided all the conversations that would have occurred at bookstores. I want to buy that book Apollo 13 is based on. That would be Lost Moon. No, I said the Apollo 13 movie book. Yes, it s Lost Moon. Are you listening to me?

Although the South Carolina contingent was a bit underrepresented at the recent conference in Macon, (We expect more of you folks next year. Hint!) lots of news and new projects are brewing in the region.

Settlemyre Planetarium, Rock Hill

Glenn Dantzler reports they re in the process of upgrading their facility. A new pan system has been installed; soon it will be connected to their console and eventu ally automated.

Speaking of automation, the planetar ium will soon add an East Coast Control system to improve their facility. Hopefully the system will be up and operational by September.

While all this is going on, Glenn and the staff have been holding summer camps. One of them, the Winthrop Junior Scholars program held this June, prevented them from visiting the SEPA convention this year, but Glenn reports it will not be an obstacle next year. Hopefully this will allow at least one of the staff to join us in Nashville in 96. Also, they will be holding a space camp and science camp in July.

In line with their educational mission, Glenn reports that they have completed integrating a program to fit with the area s 5th grade curriculum goals and are devel oping a pilot program with the 7th or 8th grade.

The planetarium continues its reserved shows as well as their public shows Carolina Skies, Cosmic Connections, and The Secret of the Cardboard Rocket this summer.

Stanback Planetarium, Orangeburg

Jim Brown is in maintenance mode. The facility is shut down for the summer while work is being done on a variety of projects. Circuits, gears, and wires have become the subject of many long days. The planetarium will resume its normal schedule of shows starting in October.

While conducting the maintenance, Jim is also involved in teaching earth and space science classes at the SC State University as well as taking an electronics class. (Note the above mentioned maintenance... .) Jim is also online! You can reach him at the in ternet address starman@scsu.scsu.edu.

Hooper Planetarium, Greenville

The big news is of course the departure of Rick Greenawald for the dubious culture of Idaho. We wish you well, Rick. Opera tions in Greenville are continuing under the careful eye of planetarium curator Rex Smith. He and Doug Gegen, the space science coordinator, will be teaming up for several combined activities with the planetarium and observatory.

Also on the drawing board are several integrated programs with the science cen ter utilizing the capabilities of the Digistar projector. A new health science program among others is in the works.

Currently the planetarium is offering several public shows including: Bear Tales, a Digistar demo program, and a live star talk. Although I m not sure if Rex has an Internet address, you can reach Doug Gegen at Zeppguy@aol.com.

Todd Slisher
Gibbes Planetarium
Columbia

DuPont Planetarium, Aiken

Welcome Jim Mullaney! He s the new director but by no means new to the field, having been involved in the planetarium and astronomical community for many years.

Jim reports their Digistar II (the third worldwide) is now installed, although much work remains to be done over the summer. This 30 facility sounds well equipped with a Sky Scan automation system, Barco 700 video projector, an all sky system, and many more goodies. In August, they ll install a new cove lighting system from JHE.

Jim gave a very favorable review of the Digistar II s new sky. It has smaller stars and many deep sky objects that had been missing from previous facilities. It sounds like a wonderful facility. The new planetarium s official opening date is tentatively planned for the weekend of September 16th.

Planned shows include an opening demo show, a sky tonight program, and a Christmas show. In addition to all the work on the new facility, Jim is also in volved with group activities and observing sessions. Jim is also online and can be reached at the address JamesM@aiken.scarolina.edu.

Gibbes Planetarium, Columbia

The big news here is the new arrival. I m not talking about new equipment, but something even more exciting. Daniel Guill was born on June 14th, and Jeff and Lani report everything is going well, except their sleep quotient. I m sure we ll soon have Danny running the planetarium for the weekend shows, or at least trying to press

some buttons.

Recently, we ve been in full tilt produc tion mode (with a small interruption for the SEPA conference) working on a new show entitled How s the Weather Up There? This program should be exciting with local forecasters providing weather reports from the planets, and several live demonstrations.

We ll be using a Van de Graaf generator to demonstrate lightning and liquid nitro gen to illustrate the temperatures at the outer planets. The show opened July 1 for a summer run until the ghosts and goblins reappear this fall.

Also this summer, our night sky pro gram, Carolina Skies, will be getting an overhaul. As usual, group bookings con tinue through August.

Our starlab outreach program com pleted a very successful run at the end of the school year, and work is in progress for new programs and additions for the following year.

In addition to the above, we hope to be linked to the Internet soon and offering several online services. Till then contact me at the world s most confusing email

Todd Slisher
Gibbes Planetarium
Columbia

Sudekum Planetarium, Nashville

For those who were not in Macon, I re gret to announce that Jim Chapman, artist and production designer at the Sudekum Planetarium for five years, was stolen away by The Tennessean, the Nashville morning paper published by Gannett. Hopefully by the time you read this, a new artist will already be on board.

Through The Eyes of Hubble will be playing through the end of September until The Light Hearted Astronomer returns to the Sudekum Planetarium. Meanwhile production continues on Rusty Rocket s Last Blast. And if you will permit me to brag, The Planet Patrol: Solar System Stake Out is currently playing in Mel bourne, Australia.

Kristine K. McCall
Sudekum Planetarium
Nashville

Craigmont Planetarium, Memphis

Former Craigmont High School princi pal Dr. Jane Walters was named the new Commissioner of Education for Tennessee. It helps to have friends in high places. Her office has forwarded information on grants that may help us acquire a satellite dish.

We d like to be able to continue interac tive video teleconferences for teacher staff development like the Private Universe series we hosted in conjunction with the Harvard Smithsonian Center for As trophysics last fall. One of the most fun teleconferences in which we participated was one for middle school students. It was called Tomorrow s Astronauts. It featured two students conducting lab demonstra tions with an astronaut and a Teacher in Space finalist at the broadcast site in Fairfax, Virginia.

One of our new astronomy interns has some experience with our school s 30,000 watt radio station, WQOX FM. With her on board this fall, we may resume our series of radio astronomy programs after a hiatus of several years. We plan to do a 60 second spot nightly just before the station signs off the air at 10:00 p.m. on school nights and maybe a weekly 10 minute sky talk on Fridays.

We d like to be able to take our student interns to Nashville next June and pres ent one of their original star shows. Lisa and I are anxious to show off how talented these young people are, and they re ready to show all you planetarium pros how it should be done. We hope to have an original soundtrack composed by AP Music Theory students.

Over the last few years our interns have put together some outstanding star shows. They ve produced what I believe to be the definitive treatment of the existence of a possible tenth planet in The Search for Planet X, a takeoff on a popular television series called Solved Mysteries, a show about cosmic collisions entitled Things That Go Bump in the Night, an Apollo 11 25th anniversary tribute in Footprints on the Moon, and a Space Telescope program called Hubble: From Here to Eternity.

We re presenting the Hubble show to open our fall semester. At Christmas we re running our annual Star of Bethlehem. We ll show Hansen s Cosmic Catastrophes in the winter and a student production in the spring.

We re getting a lot of mileage out of an edited version of Hansen s The Secret of the Cardboard Rocket, and we re also run ning Sudekum s Our Place in Space. The study guides we produced for these two shows have been very popular.

Due to budget cuts, we are still in barter mode. If you have something we can use, consider bartering with us for an exchange of services, like study guide production or

Virginia Living Museum Planetarium, Newport News

At the Virginia Living Museum we are holding our own against a resurgence of dinosaurs in our exhibit of Dinosaurs Outdoors. We have Dinosaurs indoors as well, with the first ever showing in the U.S. of The Great Dinosaur Caper: a Mesozoic Murder Mystery. It comes from the McLaughlin planetarium in Toronto, Canada. This is the best dinosaur show I ve seen so far. It s light and fun but doesn t skimp on real scientific thought. Due to great demand we have needed to suspend our daily live tour of the night sky until September. Our observatory is open to visitors every clear Thursday night. A volunteer seminar was held on July 11th where we were able to locate and observe (though not very well) the ring nebula under a nearly full Moon!

Portsmouth Children s Museum Plan etarium, Portsmouth

The Portsmouth Children s Museum planetarium is currently running Welcome to the Universe, and Worlds of Wonder. Mike Nold tells me they are doing their first run of laser shows with a children s show Puff the Magic Dragon, as well as a country show, and (of course) Pink Floyd.

Ethyl Universe Planetarium, Richmond

The Ethyl Universe planetarium in Richmond is running From Horoscopes to Telescopes, as well as an OmniMax movie. In the evenings they have an ambitious schedule of laser shows with American Dream, Lolla Polluza, U2, Pink Floyd, and Led Zeppelin.

There is also a monthly live sky show on the current night sky.

Dave Maness
Virginia Living Museum
Newport News

Hopkins Planetarium, Roanoke

Britt Rossie in Roanoke is in the middle of renovations at the Science Museum and in the planetarium. The museum will be adding a new Physics Gallery, as well as technology, weather, and health areas. The planetarium will be adding automa tion, video, and lasers. The planetarium is currently running WSKY: Radio Station of

Berkeley Co. Planetarium, Hedgesville

All three planetarium assistants of Berkeley County Planetarium were mem bers of the Hedgesville High School track team which won the West Virginia State Track and Field Championships a great accomplishment for a team from a school which has no track!

[Editor s note: Elizabeth can hold her own in a telephone conversation. We talked about her status as Small Talk associate editor. She is an exception to my require ment that submissions to Southern Skies be on diskette or via electronic mail.

[The only computer available to her is an Apple][e with 5¼ disk drives. She also informed me there is no Internet or any other electronic mail access in the com munity of Hedgesville.

[To emphasize her points about how far Hedgesville has to go to move into the 90s, she said her town just recently acquired its first traffic light.]

Elizabeth Wasiluk
Berkeley County
Planetarium
Hedgesville

National Mole Day

Bronx, New York chemistry teacher Joan Laredo Liddell has been awarded the National Mole of the Year Award for 1995. The award was sponsored by the National Mole Day Foundation and was presented to Mrs. Laredo Liddell at an awards cer emony held in conjunction with Chem Ed 95 August 5 10 at Old Dominion University in Norfolk, Virginia.

National Mole Day is celebrated each October 23rd in honor of the mole, which in chemistry is a fundamental way of counting atoms and molecules. A mole of a substance contains the Avogadro number, 6.02×10^{23} particles of that substance. It is celebrated from 6:02 a.m. to 6:02 p.m. on October 23rd (sometimes written 10/ 23). The theme/ slogan for National Mole Day 1995 is Let s Celebrate Mole Di Gras.

Become a member of the National Mole Day Foundation by sending a tax deduct ible $10 donation/ membership fee. You ll get an idea book and several newsletters each year.

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Tales of a Morehead Intern:

His Adventures with the People from Beyond the Console

Jonathan Garrison
Morehead Planetarium
Chapel Hill, NC

Astronomy? Why don t you major in something practical? said the well meaning woman from beyond the console. Curbing my dogma, and restraining what would otherwise have been a lengthy ser mon on why astronomy need not justify its own existence, I merely squeaked, Well, it s what I enjoy.

Admittedly, a weak answer; especially when compared to Kepler s response to the same question. I believe he said something like, Do you ask the sparrow why he sings? Sounds like a line from a Carpen ters song, doesn t it? I should have said the same thing. But then, I m no Kepler... or Carpenter, for that matter.

She couldn t help it, though, that well meaning woman from beyond the console. Why should I expect her to share my enthusiasm for the cosmos? It s only the universe. It s only, by definition, ev erything!

At least, that s the way I used to feel. I have, since, come to learn that people don t always see it that way. And that s okay. That s why we re here, we planetarians. It s to remind the others, those people from beyond the console, what s out there. It s to show them the beauty that we relish and the natural wonders that they, sometimes, take for granted. It s a task that I consider to be a great privilege.

Truth be told, I was asking the why astronomy question myself, not too many years ago. I started my college career as a computer science major something practical. It was something I enjoyed, but it wasn t really what I wanted to do, full time, for the rest of my life.

I envisioned myself, years into the fu ture, as an emaciated techno drone hack ing away at a keyboard from the inside of a vacuum sealed cubical in the middle of a gigantic office building, with all the in terpersonal skills God gave a ripe tomato. Altogether too practical for me, thank you very much.

But, that s where the money was. And, it was where I was heading, given my par ticular interests and skills. It was the only logical path for me. Or was it?

I had always been interested in science, especially astronomy, so when I saw the job notice for planetarium work, I became very excited.

I was, at that time, a freshman attending a junior college in Ft. Myers, Florida, and, until that point, had never even considered my interest in astronomy to be vocationally viable. But there it was: a small index card on the job board in the cafeteria.

The wage offered was a pittance. I was living at home and was fortunate enough to have obtained a scholarship which paid my tuition. So, for what would be the last time in my life, income didn t matter much. I had to have that job.

My mind filled with the memories, all too faint, of childhood visits to those won drous planetariums. One of the earliest and fondest of such memories included that of a visit to the planetarium at the Museum of Arts and Science when my family lived in Daytona Beach. I just had to get that job!

I did. A couple of weeks after my initial inquiries and a subsequent interview, I was hired. On my first day, I was given a tour and invited to see the Christmas show being featured at the time. As I sat in the theater, waiting for the show to start, I looked around.

Mannheim Steamroller s first Christmas album was playing as walk in music. The star machine which was, as I would soon come to learn, a Spitz 512, was set and ready. At that moment, before the general public was let in, I felt quite exhilarated.

Had you been there, you might very well not have felt it. You probably wouldn t have seen it in my eyes or noticed the change in my body language, but it happened. It all clicked, and I knew no, decided that planetarium work would be my career.

Now, I know what your thinking. It s not as if Urania, sweet muse of astronomy, whispered in my ear a tune so intoxicating that I would forever be singing it within my heart. It was nothing like that.

It was, however, a very decisive moment in my life. I had chosen my path. I chose astronomy. Astronomy, however, did not choose me. (My lack luster skills as a mathematician are a living testament to that fact!)

I worked nearly three years at that

planetarium in Ft. Myers: from the winter of 87 to the fall of 90. During that time I learned of an internship offered by the Morehead Planetarium in Chapel Hill, North Carolina.

I made some inquiries, and found that to be awarded the internship, an applicant must have completed a Bachelor s Degree and be accepted into graduate school at the University of North Carolina.

At the time, I hadn t even finished my Associate of Arts Degree. Austin Guiles, assistant director of Morehead at that time, and past Morehead intern himself, encouraged me to apply at a later date, when I could meet the minimum require ments.

I did just that. I finished my two year degree in computer science, then worked full time at the Ft. Myers Planetarium for a year. It was then that I decided to move on.

I applied to the University of Florida and was accepted as a junior, majoring in astronomy. Three years later, I graduated from U.F. with a B.S. in astronomy and a minor in physics.

Always, in the back of my mind, was the thought of the internship. Before I gradu ated, I contacted Austin Guiles, and asked about the internship. I didn t expect him to remember me. To my pleasant surprise, he did.

He informed me that the internship was alive and well, and sent me the necessary information. I filled out the application, and some time later, received a request for an interview.

It was nervewracking, those weeks of waiting. I had to get that internship. It meant far more to me than any mere job opportunity ever could. You can under stand why I was thrilled when I got the news.

Since that first day at the Ft. Myers Planetarium, I had come to learn of More head s reputation, among some, to be the finest planetarium in the Southeast. I hope my colleagues at other planetariums will forgive me if, during my tenure as the Morehead intern, I have acquired that same opinion.

I have enjoyed my time as an intern and have learned more about those people from beyond the console, as well. The internship lasts for two years, and, in that time, the intern is required to do many things. The two most important of these is to earn a Master s degree in a planetarium related field from the University of North Carolina, and to write and produce a full length planetarium show.

In addition, the planetarium intern is required to teach part of the introductory astronomy labs for the university. I found this to be particularly educational, for now I would have to deal with students. Yes, students.

I have often used the term student as a four letter word, but always... , er, usu ally... , kiddingly. These, students, are a completely different kind of people from beyond the console. Unlike the average planetarium patron, these, students, don t want to be there.

After they get past the thrill of being in a round room, they can really become quite a tough audience. I had never before dealt with the just try and teach me something mentality.

Most of my interaction with planetarium patrons had been rather pleasant, as they were often eager to learn new things. But not the students. Oh, there have been some, a precious few, who were eager to learn. But they are, sadly, rare.

The internship, if anything, has taught me how to deal with students. It has taught me how to be, in many ways, the best kind of planetarian: a planetarian who not only shares his or her enthusiasm for astronomy, but also inspires it, if only for a fleeting moment.

If that moment is particularly special, it can plant a seed of curiosity that could blossom into a lifelong interest. It may not necessarily be astronomy. It could be almost anything.

Nonetheless, the opportunity to share your wonder for the cosmos with someone else, is one that should not be missed or underestimated. This, I think, above all else, is the most important thing I ve learned as a Morehead intern.

It s been two years since my arrival at Chapel Hill, and my time as intern is nearly up. Sadly, there will be no intern replacing me. Due to budget constraints, I will be the last Morehead intern for at least a year. Austin informs me that this has happened before.

I hope, as I m sure all planetarians who read this do, that the Morehead internship finds new funding and is reborn. I consider my time here to have been one of the most important chapters of my life. I would find it a tragic thing, indeed, to have been the last intern.

Toshiba/NSTA ExploraVision 1995 – 96 Awards Program

NSTA Press Release

A battery powered toothbrush, a milk carton with a pH indicator, a battery powered wheelchair with a hydraulic lift, and a playground peacemaker these are just a sample of the future innovations from the national finalist teams in the 1994 95 Toshiba/ NSTA ExploraVision Awards competition.

Working in teams of three or four with a teacher adviser, the students chose a present technology and envisioned how it might be used 20 years from now. More than 18,000 students in grades K through 12 from the United States and Canada entered the 1994 95 competition.

The 12 national finalist teams four first place and eight second place teams received a weekend trip to Washington, D.C., that included a press conference and visits on Capitol Hill.

In addition to a trip to the nation s capi tal, students on the first place teams each received a $10,000 U.S. savings bond, and students on the second place teams each received a $5,000 U.S. savings bond. The teacher adviser and schools of the national finalist teams were awarded their choice of Toshiba products, such as laptop comput ers, copiers, TVs, and VCRs.

Entry kits for the 1995 96 competition will be mailed to teachers in September. The deadline for entries is February 1, 1996. If you do not receive an entry kit by October 15, please contact the Toshiba/ NSTA ExploraVision Awards Program, 1840 Wilson Boulevard, Arlington, Virginia 22201 3000. Call NSTA at (703) 243 7100 or call toll free to (800) EXPLOR 9 after September 1, 1995.

The Toshiba/ NSTA Explora/ Vision Awards Program is funded by Toshiba Corporation, Toshiba American Group Companies, and the Toshiba America Foundation. It is administered by the Na tional Science Teachers Asociation.

Duracell/NSTA Scholarships

NSTA Press Release

The Duracell/ NSTA Scholarship Com petition invites students in grades 9 12 to design and build working devices powered by Duracell batteries. Students must be U.S. citizens or reside in U.S. territories to be eligible.

Everyone who enters will receive a gift and a certificate. All students winners will receive personalized award certificates. The 100 top finalists must send in their actual devices to receive an award. Prizes will be awarded as follows for these final ists:

First place	(1)	$20,000
Second place	(5)	$10,000
Third place	(10)	$1,000
Fourth place	(25)	$500
Fifth place	(59)	$200

The awards will be in the form of a U.S. savings bond. The top six winners will be flown to St. Louis to attend an Awards Banquet held in the winners honor at the 44th NSTA National Convention.

Teachers of the six top winners will each receive $3,500 gift certificates for comput ers and accessories. Teachers of the ten third place winners will receive a $50 gift certificate for NSTA publications; teachers of the 25 fourth place winners, a $25 gift certificate. Teachers of the 59 fifth place winners will receive a Duracell gift.

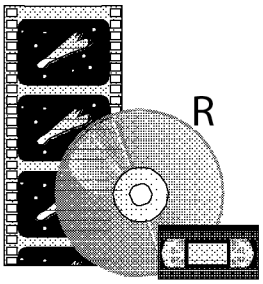
Obtain an official entry form from Du racell/ NSTA Scholarship Competition, 1840 Wilson Boulevard, Arlington, Virginia 22201 3000 or call (703) 312 9258. Fill out the entry form completely and obtain all the necessary signatures.

Then design and build a device which runs on Duracell batteries. Write a two page description describing the device and its uses. Draw a schematic (wiring diagram) of the device, and photograph it. Mail the entry form, the typewritten de scription, the schematic, and the photos to

AstroVideo Review:

Clyde Tombaugh and the Discovery of Pluto

Mike Chesman
AstroVideo Review Editor
Bays Mountain Park Planetarium
Kingsport, TN



Mike Cutrera

This month I m reviewing a videotape that has been in our collection for a number of years. It was obtained from the Astronomical Society of the Pacific, although I don t see it listed in their latest merchandise catalog. The title is Clyde Tombaugh and the Discovery of Pluto. It was produced at New Mexico State Univer sity under a grant from the V. M. Slipher Committee and bears a 1985 copyright.

The tape appears to have been made with a home camcorder and the picture quality is only adequate. A bigger problem is the audio which appears to have been picked up by a rather distant microphone. In some indoor settings, the reverb of the room makes it hard to make out what is being said. Still, to listen to the personal recollections of Pluto s discoverer is an en joyable task. Clyde Tombaugh has a folksy, unpretentious style that is quite charming and add to that a remarkable memory of every date, time, and detail surrounding his planet search.

The program runs about 45 minutes and is well suited for astronomy meetings or classes. I have used it several times with groups of retired folks who take continued learning classes in our area. They have always had lots of good comments after a viewing. Let me use the rest of this article to give you some feeling for the content of the tape.

The video begins by reminding us that only three planets have been discovered in recorded history; only one, in the 20th cen tury. It is also pointed out that Pluto was the first planet to be discovered through photography. The program also includes lots of vintage photos from the Lowell Observatory archives, plus background information on Percival Lowell and his hunt for Planet X.

Born in Illinois, Clyde Tombaugh was introduced to astronomy by his Uncle Lee, who owned a three inch telescope. When, at age 16, Clyde moved with his family to Kansas, he began making telescopes. His third instrument, a 9 reflector, was completed in early 1928. He still owns the telescope and proudly shows off the parts fashioned from discarded farm machinery and his dad s 1910 Buick.

By fall he was sketching Mars and Ju piter and happened to send some of his drawings to Lowell Observatory. Quite by chance, they were looking for an ama teur to help operate a new photographic telescope to resume a search for a ninth planet. He was invited to Flagstaff for a three month trial period, and, as Clyde says, I stayed 14 years.

Tombaugh shows us the equipment with which the search was mounted a 13 three element objective lens focused on 14 x 17 glass plates. He demonstrates the Zeiss Blink Comparator. We get a feel ing for the magnitude of the work as we learn that the average star density per plate was 160,000 stars. Some fields had nearly 400,000 stars.

At first Tombaugh was only to take the images, and the professional astronomers would study the plates. After the first 100 plates turned up nothing, they decided to throw in the towel. Clyde was asked to take over the plate studies.

The rest is history. In less than a year, Tombaugh discovered the elusive object. The planet was found February 18, 1930 at 4 p.m. The joy of the moment is fully recounted through Tombaugh s detailed narrative.

We are privy to the observatory s pri vate meetings after the discovery, how information was guardedly released to the astronomical community, and the naming of the new object.

In case, you think Tombaugh s career ended with the discovery of Pluto, consider that he stayed at Lowell Observatory until the mid 1940s. In addition to a search for a tenth planet, he discovered hundreds of asteroids, a super cluster of galaxies, and a new globular cluster.

He went back to school and earned degrees in 1936 and 1939. He was in strumental in setting up the astronomy research and teaching programs at New Mexico State University. Today in his nine ties he still travels and gives lectures.

The tape was produced and directed by Thomas Hockey and distributed by the Astronomical Society of the Pacific, 390 Ashton Avenue, San Francisco, CA 94112. Call 800 335 2624.

Meteorites in the Planetari-

Dennis J. Cowles
Louisiana Nature Center
New Orleans, LA

I collect meteorites. Not big ones, though, they cost way too much for the budget of a lowly planetarian. Little slices of meteorites. I am fortunate enough to own fourteen of them, plus some other miscellaneous items. Those little rocks are pieces of places that I ll never get to visit. They are a connection to the solar system for me. I ve touched other worlds through them. I plan to add more specimens to my collection. And meteorites can be very useful in the planetarium. This article will offer some basic information about meteor ites, discuss some ideas about incorporat ing meteorites into your planetarium, give a couple of book recommendations, and give some suggestions on how to locate meteorites for purchase or for a loan.

First some essential facts. Meteorites come in three basic types: stony, stony iron, and iron. There are subdivisions within each type. We ll look briefly at the types and their major subdivisions. We ll then consider each in more detail, and a brief discussion of tektites will follow.

STONY METEORITES

- Chondrites contain spherical inclu sions called chondrules (thus the name). These chondrules are not found in normal, terrestrial rocks.
- Achondrites are stony meteorites that do not contain chondrules.

STONY IRON METEORITES

- Pallasites are a mixture of olivine crystals in a matrix of nickel iron.
- Mesosiderites are a mixture of dif ferent mineral fragments cemented together.

IRON METEORITES

Irons (or nickel irons) can be classified according to their internal crystalline structure.

- Hexahedrites when etched with acid show many fine parallel lines running through them (Neumann lines).
- Octahedrites when etched with acid show the pattern that is diagnostic for iron meteorites, the Widman stätten pattern.
- Ataxites have a relatively high nickel content (over 13 percent). There is so much nickel that the Widmanstätten pattern can only be seen through a microscope.

NOTE: Meteoriticists will tell you that the classification scheme given above is not the one actually used professionally. This is completely true. But planetarians don t normally have access to the special ized apparatus used to classify them. The system given above is the one used when purchasing meteorites through a commer cial dealer or a mineral supply company.

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The chondrite meteorites are the most common type of meteorite, about 85 per cent of all known meteorites. They are broken down into the following types:

Ordinary Chondrites

- H (High iron) or olivine bronzite
- L (Low iron) or olivine hyper sthene
- LL (Low Low iron) or amphoterite

Enstatite Chondrites (E)

Carbonaceous Chondrites

- CI Ivuna type
- CM Mighei type
- CV Vigarano type
- CO Ornans type

The carbonaceous chondrites are classified according to their similarity to a prototype. Thus, a CV is most similar to the Vigarano carbonaceous chondrite.

A number is given after the letter des ignation, indicating the petrologic type. The petrologic type tells how much the meteorite has been altered through heat ing. The lower the number, the less altered the specimen. The only meteorite type with a petrologic number 1 is the CI. (Interest ingly enough, the CI chondrites don t pos sess chondrules! But they are classified as chondrites due to chemical similarity with the CM2 and CV2 chondrites.)

The enstatite chondrites are quite rare,

representing only about 2 percent of the stony meteorites. The E chondrites are further subdivided in H type and L type, depending upon the ratio of free iron to combined iron. They are very low in oxygen, and some scientists think that they may have formed inside the orbit of Mercury!

The carbonaceous chondrites are a very interesting and very rare type of meteorite. They are (obviously) carbon rich. The elemental abundances of the carbonaceous chondrites closely resembles that of the Sun (minus hydrogen and helium), and they show practically no alteration through heating. They are considered to be the most primitive of all meteorites.

These chondrites are interesting because some of them are known to contain amino acids and other types of organic molecules. All carbonaceous chondrites show water bearing minerals. The oldest known rock in the solar system is a carbonaceous chondrite. It fell in Allende, Mexico in February 1969, and is 4.56 billion years old (and I have a slice of it sitting on my desk as I write this). In contrast, the oldest known Earth minerals are some quartz grains found in the Australian desert in the mid 1980s that are about 4.1 billion years old.

The CV type carbonaceous chondrite (Allende is a CV3) contains white inclusions (calcium aluminum inclusions, or CAIs). These inclusions have very unusual isotope ratios, and some recent research has shown that they contain interstellar dust grains, probably formed from the debris of supernova explosions (Lunar and Planetary Science Conference, Southern Skies, Spring 1995). These CAIs are about 200 million years older than the solar system. Another carbonaceous chondrite, which fell in Murchison, Australia in September 1969 is believed to be from beyond our solar system!

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The achondrites are broken down into several different classes. These include aubrites, ureilites, howardites, eucrites, diogenites, shergottites, nakhlites, and chassignites.

Aubrites are enstatite achondrites. They are named after a fall near Aubres, France, in 1836. They are light tan or white in color. Aubrites are a rare type, with less than twenty known. The largest fall of an aubrite (over a ton of material recovered) was in Norton County, Kansas, in 1948. (I have a few tiny pieces from this fall.)

Diogenites are named after the Greek philosopher Diogenes of Apollonia. Diogenes lived in the fifth century B.C., and is believed to be the first person ever to suggest that meteorites come from beyond the Earth. Diogenites are about as rare as aubrites. Diogenites are believed to have formed in magma chambers in the parent body, under slowly cooling conditions. (I have a one gram piece of diogenite that fell in Tunisia.)

Eucrites are the most common achondrite. They are similar to basaltic lavas from the Earth and the Moon. Some even have holes caused by gases dissolved in the rock when it was still molten. Eucrites are thought to be formed from quickly cooling magma, forming very small crystals, as opposed to the large crystals of diogenites. The parent body of the eucrites is believed to be the asteroid 4 Vesta.

Howardites are thought to be the soil of a parent body, formed from the pieces of the parent body (like diogenites and eucrites) and pieces of presumed impactors (like chondrites). Howardites are the cemented fragments of the regolith, or surface material, on the asteroidal parent body. They show damage from cosmic rays and solar wind. Howardites may also come from the asteroid Vesta.

Ureilites are rare as diogenites and don t seem to be related to other achondrites. Ureilites contain carbon in the form of microscopic diamonds, possibly formed from tremendous pressures generated by the impact of one asteroid with another.

The shergottites, nakhlites, and chassignites are from Mars. See the article Rocks from Mars (on page 7 of this issue) for more information about the SNC meteorites.

There are other types of achondrites, such as the lunar achondrites found in Antarctica (One was found in Australia and now is in Robert Haag s collection.), and some other types that are seemingly

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The most beautiful type of meteorite is a pallasite. Once you see one, you will never forget what it looks like. Pallasites are composed of (usually) large crystals of olivine in a matrix of nickel iron. I can t even begin to describe what one looks like. Unfortunately, pallasites are highly prized for their beauty, and therefore very expen sive. (I own a tiny little piece of a pallasite, I can t afford a large slice.) There is a bit of a mystery about pallasites. No one has explained how the olivine crystals could have remained intact in a molten metal mixture. Since the olivine is embedded in the matrix, the metal must have been fairly molten for the olivine to be so evenly mixed in it. But olivine has a lower melting point than the metal, so how did the crystals remain intact? A mystery.

Mesosiderites are the other major type of stony iron meteorite. The primary differ ence between a pallasite and a mesosider ite is how the internal structure appears. While a pallasite has crystals of olivine held in place by a metal matrix, in a me sosiderite the metal is usually in the form of angular fragments in a stony matrix. All of the minerals in a mesosiderite are in the form of fragments. These fragments usually show some evidence of shock, and a type of quartz (known as tridymite) is found in mesosiderites. Tridymite is usu ally formed by shock. Mesosiderites are believed to have formed on the surface of a parent body when another body impacted with it.

There is another, extremely rare type of stony iron known as a lodranite. They are similar to mesosiderites, but with a slightly different mineral composition. There are only two known lodranites.

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Iron meteorites are what most people expect meteorites to be like. They are heavy and they are dark. Irons are the most common type of found meteorite, because they weather better than the other types. The impactor that created the Barringer Crater in Arizona was an iron meteorite (the remnants of which are known as the Canyon Diablo meteorite).

As mentioned above, irons typically show the beautiful Widmanstätten pattern that is truly unearthly. I have a very nice slice of an iron that fell in Gibeon, Namibia that has been etched to bring out the pat tern. It usually elicits gasps from people who have never seen a meteorite before.

There is a sort of hybrid type of iron meteorite known as a silicated iron. They are classified as irons, but they contain a significant amount of inclusions, usually silicates. Many are very striking to look at, some being almost as beautiful as a pallasite.

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Tektites are blobs of glass like material, similar to natural volcanic glasses. Tek tites are believed to form from the impact of an object with the Earth, when large amounts of molten rock are thrown high into the atmosphere. As this rock cools, it forms tektites. Tektites show signs of travel at high velocity through the atmosphere, just like meteorites. Curiously, tektites contain practically no water. This has been used as an argument against a terrestrial origin for tektites, but there seems to be no other explanation that fits.

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As I mentioned in the first paragraph, I also have some miscellaneous items in my collection. These include a Tektite that was found in Tibet, some bark from a Siberian spruce that was knocked over in the Tunguska blast (and which has microscopic particles from the impactor), and some iridium rich sediment from the Cretaceous Tertiary boundary from Gubbio, Italy (the same place that Alvarez and Co. got theirs). Also very useful in the planetarium.

Meteorites give us the opportunity to astound people. Not only can we talk about the planet Mars, we can let our audiences look at a piece of it. We can let them hold a little piece of Vesta. We can show them a tektite, and tell them that they are probably formed when a large object collides with the Earth. We can show them examples of other places in the solar system, places that they ll never get to go, but that will seem a little more real once they ve touched them. Can you even imagine the expression on someone s face when you hand them a meteorite? I ve

(This article will be continued in the fall 1995 issue of Southern Skies.)

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