

# President's Message

Once again, I am late writing this and getting it to our wonderful, dedicated, and very patient editor, Duncan Teague (Memphis, TN). My procrastination has delayed your Journal, and I apologize. How time flies when you're having fun. Actually it also flies when I am not having fun. Unfortunately some duties take priority over SEPA.

However, Duncan has also been busy. When last I talked to him, he and several of his former students were about to fly to Washington, DC., to participate in the finals of the Thinkquest competition. How exciting that his work and that of his students will receive national recognition. He assured me he would write about it for the Journal.

Of course, this is a good place for me to encourage all of you to write about what is happening in your neck of the universe. Did you hold a memorial service for Mars 96? How many people showed up for your eclipse party when the sky was completely overcast? Would you please share the plans for the nifty rotator that you built out of a spam can? The Journal is a major pipeline for communication between domes, so let us know what you are doing!

This is my last President's message, and no matter how hard I try, I cannot squeeze any profound statements out of this computer. So here goes...

We'll miss you George...

It is with deep regret that I announce the untimely death of George Brown, long time Director of the Pink Palace Planetarium in Memphis, TN. (I should point out that the name of that facility was recently changed to the Sharpe Planetarium, but most people will know of it as the Pink.) Joyce Godfrey, former science coordinator at the Pink Palace Museum and a close friend of George's, was also killed when their motorcycle was hit head on by a car passing in their lane. This happened on Saturday, December 7th.

George started working at the Pink Palace Museum Planetarium when he was 17 and never left. He earned a bachelor's degree in journalism and a master's degree in natural science with an emphasis on archaeoastronomy. In the last couple of

years, George played a critical role in the major renovations and expansion of the Pink Palace Museum including managing the IMAX theater.

Under his direction, the Planetarium produced numerous shows. Many of these programs were designed to complement the annual Memphis in May celebration that highlights particular countries. The Planetarium shows featured the cultural and astronomical contributions of various nations around the world; from the Netherlands to Japan to Australia. These programs plus others covering topics such as astrology and the death of the dinosaurs were sold to 300 planetariums across the United States and in other countries.

I regret that I did not get to know George Brown very well. I was surprised to learn that he was only 40. We have missed him at several recent SEPA conferences, but his contribution to the planetarium community is indisputable. He truly loved to share the sky with others, and his raucous sense of humor will be sorely missed.

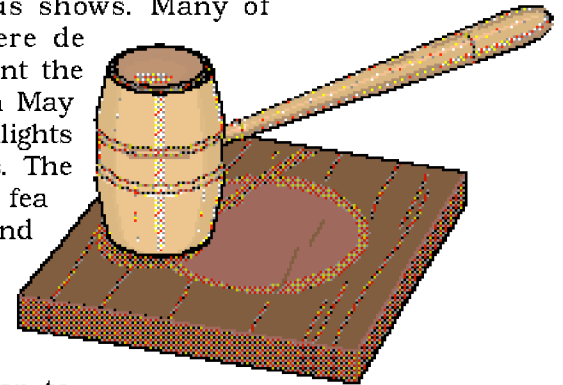
Just a little philosophy...

For quite a while, there was a raging discussion on the Internet about the pros and cons of traditional optical versus computer based planetarium projectors. There are also the old questions of tilted versus non tilted domes and concentric versus unidirectional seating plans. Then there is the never ending debate about live versus canned programs.

If I have learned one thing from participating in these bull sessions it is that there is no definitive answer. Every dome is different. Every audience is different. Every planetarium director is different. Every facility has a slightly different mission. It's a clear case of "if the shoe fits, wear it."

I, like most of you, have an opinion about such things. But just when I convince myself that I am right, something happens to make me question my be

Kristine K. McCall  
President  
Sudekum Planetarium  
Nashville, TN



liefs.

For example, I have a canned show that was purchased from another producer that is a very traditional, conservative discourse reverently narrated by a single, God like voice. It is a good show, and while I did not like it at first, it has grown on me. However, most audiences find it a little slow. I ran it a few weeks ago, and while distributing star charts to people leaving the theater, a lady comes up and says, I've been coming for years, and this is the best show I have ever seen. I did not ask her to be more specific about how many years she had been coming or when her last visit was. Nor did I take it personally since it was not one of our productions. It just reminded me that it takes all kinds. People are different. Some learn best listening to a collegiate lecture while others can get lots of information from cartoon aliens invading our solar system.

Then there was the well dressed (coat and tie), middle aged, educated gentleman who stopped at the console after seeing one of our original productions which is geared toward younger people. He said how much he loved it, that he learned a lot, and that it was the best ever.

One of our educators was stopped in the museum lobby last week by a businessman leaving the administrative offices. He did a double take and came back to tell her how much he, his daughter, and her fiancé enjoyed her live sky show on Saturday.

The same way that one size shoe will not fit everyone in your audience; no single method of presentation or subject will suit every audience or every theater.

I am very guilty of being a stick in the mud on some things. My staff points it out frequently. It is easier to stay in my rut than to change and adapt to new technology or try new methods. It's more convenient to stay with the tried and true. It's safer because you know what the outcome will be. It's cheaper because there is no additional time or money needed.

It's like a bear who goes into a cave and hibernates for the winter. It's nice and warm, and all he does is sleep. Several months later, he gets a little hungry, but doesn't want to leave the nice cave. I am like the bear. When I finally have to leave the cave, I am GROUCHY. I freely admit it, and my staff will agree. But once I get out, stretch, wake up, feel the warm sun, smell the roses, admire the scenery, and

taste a little of what it has to offer, I usually discover that I like this place. I may find some bitter herbs, but more often than not, I look for ways to make the most of the situation. I can add it to my repertoire, and I am richer for the experience.

Everyone has an opinion. That's what makes this country great. Everyone has different experiences and audiences. Everyone's feet are unique. If you find something that works for you, by all means, make the most of it. But don't be afraid to try new things, new foods, new methods, new technologies. You may find something you really like, something to augment or complement what you are already doing, making you and your facility even more valuable and appreciated. This is true whether you are giving a basic, live sky tour or taking your audience on a fantastic voyage through the human body. Also, sharing your experiences, both good and bad, may help someone else avoid a mistake or spark them to create the ultimate program. It's more comfortable to stay in the cave, but if we all did that, then the species might become extinct.

Another attempt at profundity...

Lastly, it is hard to believe that my term as President of SEPA is almost over. At last I can pass on the mantle of responsibility, the slings and arrows, the heavy yoke of duty to the very capable shoulders of Mike Chesman (Kingsport, TN). After January 1, 1997, kindly direct your complaints to him. It has been my honor and privilege to serve SEPA as President. I hope that I have made a difference. I must stress that while I was President, there was a whole team of people serving on Council and various committees who did a lot of hard work. They made me look good. If asked to serve SEPA again or to host another conference, I might actually say yes.



# It's That Time Again!

With any luck this fall (AHAHAHAHA!) issue of Southern Skies may actually reach you before the winter solstice. I'm keeping my fingers crossed.

Please note several important items.

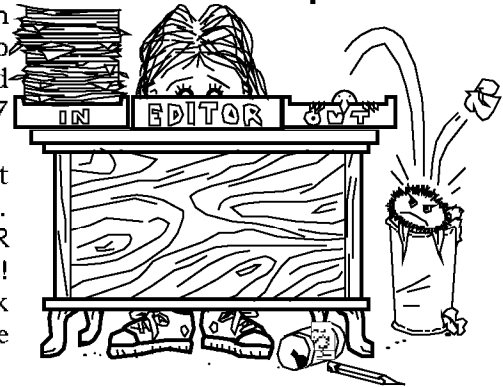
The deadline, ahem, for the next issue happens to fall on January 1, 1997. I don't realistically expect any of you, well, maybe Elizabeth Wasiluk, to meet that deadline, but it would be real nice if I could get your text files by the middle of January. How about making it one of your New Year's resolutions that you actually keep for a couple of weeks. That might be just long enough for me to get your submission in a timely manner, and I just might get the winter issue to you before Hale Bopp reaches perihelion.

Your 1997 membership dues are now due. Please remember that we voted several years ago to have our membership on a calendar year basis instead of from one annual conference to the next. I sent the Sudekum staff a list of individuals who had already paid their 1996 dues prior to

the Nashville conference, and they should not have collected dues at registration from those folks. If you paid your dues at the Nashville conference, please note that payment was for 1996, and your 1997 dues are payable now. If you were on my list of paid up 1996 members and you paid your 1997 dues at the conference, then contact me individually. **AND DON'T EVER DO THAT AGAIN!** I'll have to check the database the Sudekum staff created and compare it with my records.

Please help out your poor, pitiful SEPA treasurer by paying your dues when they are due. If I ever master FileMaker Pro, maybe I'll be able to accommodate dues payments at odd times of the year, but I

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



Mike Cutrera

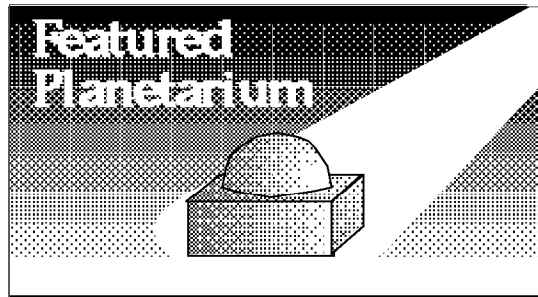
Send your \$15.00 check made payable to SEPA to the following address:  
Craigmont Planetarium, 3333 Covington Pike, Memphis, TN 38128 3902

Name		
Planetarium		
Organization		
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# PJC Science & Space Theatre

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

Pensacola Junior College has the first Digistar in Florida. Partially funded by the National Science Foundation, it opened to the public in January, 1993. The theatre has 123 unidirectional seats under a 40 foot Astrotec dome. A JHE Screenmaster



III automation system controls 9 Carousel projectors, a bank of 7 panorama projectors (25% overlap) spanning 210°, a bank of 6 all sky projectors, and 32 channels of effects. Among the effects are two zoom projectors, two slews, and a number of Sky Skan and home built effects.

The control console is packed with a four channel audio cassette deck, Pentium computer, VHS tape deck, JHE automation controlled laser disk player, plus the standard Digistar terminal, button box, dial box, and graphics monitor. A Sony 1042Q videoprojector displays laser disk, VHS, or computer input. A second videoprojector and Spice/Nutmeg controlled laser disk player will be added soon.

Cables are in place to allow projection of CCD telescope images from a viewing deck just outside the front exit of the star chamber. This was convenient during eclipses, comet watches, and the Jupiter comet impacts when crowds overflowed the telescope viewing deck. Telescopes include 8 Celestron and Meade S Cs, several 6 Newtonians, a 5 Maksutov, and a 4 f16 refractor. Members of the Escambia Amateur Astronomers Association assist with telescope viewing between planetarium shows once a month. The Association makes its 16 f4.5 Newtonian available to planetarium patrons on special occasions.

The automation system computer and monitor are installed in the rear projec-

tion gallery, along with the audio mixer, two Tascam four channel reel to reel tape decks, and a CD player. Circular stairs provide handy access to a catwalk behind the dome where the power amplifiers and JBL 4430 stereo speakers are located. Two 18 JBL subwoofers on the floor of the star chamber round out the audio system.

This facility replaced the former E.G. Owens Planetarium which had served the college and the local community from 1967 until it closed in 1991. Its 30 Spitz dome and A3P projector have been refurbished by Ash Enterprises and recycled to the West Palm Beach school system.

The planetarium is reserved for college astronomy classes two days and one night a week. Seven morning school shows are presented each week. Three public programs are given each Friday and Saturday evening. The final show is generally a computer graphics show featuring 3 D Digistar images with musical background (our poor man's laser show). Shows featured in public programs during the academic year are rerun as special afternoon programs in summer months for day camp groups. Current admission rates are \$3 for adults and \$2 for students. PJC students and staff are admitted free.

The closest neighboring planetariums are all a three hour drive away: Montgomery, AL to the north, Tallahassee to the east, and Jackson, MS to the west. Because of this, the Science and Space Theatre attracts school groups from as far away as Panama City and Mobile.

The staff consists of Director Clint Hatchett, VAX System Manager Joyce Divina, Curator Frank Palma, Astronomer Wayne Wooten, Lecturer Carol Palma, and a number of part time technicians, reservationists, ushers, cashiers, and console operators.

We look forward to hosting the 1997 SEPA conference in Pensacola June 10



Frank Palma  
Author  
Science and Space Theatre  
Pensacola Junior College  
1000 College Boulevard  
Pensacola, FL 32504

Right: The outer geodesic dome and colonnade of the Science and Space Theatre provide a dramatic architectural focus along the facade of the Baroco Center for Science and Advanced Technology on the campus of Pensacola Junior College.

# Small Talk

During the S. E. P. A. meeting, after going to mass at the convent across the street (o. k., o. k. please refrain from making your cracks about God (big or little g), hell freezing over or any other snide remarks, please!) from the hotel I ran into John Bell with his family. We all ended up at Denny's for breakfast and realized that with the exception of both of us and Jane Hastings, not a lot of S. E. P. A. people actually have the summers off. If you do write in and let me know what you did this summer.

I guess I don't have to write to tell you about the S.E.P.A. meeting, either you were there and know how fabulous it was, or you don't want to be reminded of what you missed.

How many people went to the I. P. S. meeting in Osaka? I know some fortunate few (like John Hare and Eric Melenbrink) actually got to go to both! Wow! So who else went and what did you find out that was of interest to S. E. P. A. members? Was it as expensive as you originally thought? Did you meet any exciting people? Send us the poop. (The news silly, not that other stuff!)

Speaking of being abroad, did anyone go to the International Astronomical Union's colloquium on Astronomy Education in London?

If so, do you have anything to report? Were planetaria well represented there? I hate to just write about myself all the time, but I have to, since I don't hear from any of you, on any regular basis at all.

In early June, I went to the Mason Dixon Star Party. This is an annual event of amateur astronomers who meet each year in York, Pennsylvania where they set up swap tables, conduct homeade telescope competitions, deliver talks and observe the sky.

While there this year, I shared with the group some poetry that my introductory astronomy students wrote for extra credit.

Some of the poems were very funny!

I also went observing with the crew and saw Hale Bopp for the first time along with Comet Kropff, which was not bright at all! Along with the usual splendors of the summer sky, I saw such things as the

Veil Nebula with an Oxygen 2 filter, Uranus and Neptune, a very crisp Jupiter, a whole host of Messier objects and the HST from some predictions brought by people who actually work there.

A group of us also saw a satelliteing across the sky that looked like t objects flying in tandum, in a right SMALL T triangle shaped formation. Many of us commented that if we hadn't seen object with a group of people who saw same thing, we wouldn't have believed our eyes! Geoff Chester of the Einstein planetarium at the Air & Space Museum in Washington, D. C. helped demystify this object by use of his computer programs which he described at length during his talk at the S.E.P.A. meeting.

Another event I attended was a reunion of the Buffalo State College Astronomical Society. This group is made up of people who once took an astronomy class at Buff State, or worked at the Whitworth Ferguson Planetarium located on the campus in Buffalo, NY. Some of these people were involved in the class over thirty years ago! Some of the people were formerly my students when I taught astronomy as a graduate student over twenty years ago. Paul Krupinski, was a student of mine and a former Strassenburgh intern. He brought along his now paid for Starlab planetarium. Paul seems to have perfected a method for cleaning a Starlab, so be sure and write him if you feel yours needs to be spruced up. Planetarium director, Art Gielow of Whitworth Ferguson was also in attendance and says things are going well at Whitworth Ferguson despite his cut back to part time.

Former president of both the Buffalo State College Astronomy Club and the Buffalo Astronomical Association (both of which I was a member of as well), Terry Farrell, organized the event held at a lovely site owned by the college. This site, referred to as college camp which comes complete with dorm rooms, bunk beds, a VCR and TV, an outdoor deck with a lovely view, a barbacue pit and a fully equipped kitchen! There was no shortage of great cooks who

(continued on page 12)

Elizabeth Wasiluk  
Small Talk Editor  
Berkeley County Plan-  
etarium





Jalie Phifer  
Morehead Planetarium  
Chapel Hill, NC

# Global Mythology, Part 4:

## Autumn and Circumpolar Constellations

Global Mythology has been serialized in four parts within the 1996 issues of Southern Skies. Fall and circumpolar constellations plus a bibliography appear

### AUTUMN SKIES Traditional

In the stars of Autumn unfolds a story whose characters fill the nighttime sky. Glittering in her splendor is Cassiopeia, the stunningly beautiful Queen of ancient Ethiopia. Nearby is her husband, King Cepheus. Together they ruled a peaceful land and were loved by their subjects.

One day, the queen said that surely she was the loveliest woman on earth, even outshining the Nereids. Now, the Nereids were the beautiful sea nymphs, daughters of Neptune, powerful god of the sea. Insulted, the Nereids asked their father to punish Cassiopeia. Shaking his trident, Neptune created Cetus, the fearsome sea monster.

At once the gruesome creature began ransacking and terrorizing the coasts of Ethiopia, throwing the kingdom into a crisis. King Cepheus, in a desperate effort to save the kingdom, decided to sacrifice his daughter, Andromeda, to the monster. The queen, in a fit of despair, removed the girl from the kingdom and hid her in a cave. But the monster was inno-

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Spot Perseus land nea come by she was

shy princess didn't answer. But Perseus kept asking, and finally she began to tell him what happened. Suddenly, the huge, dark body of Cetus rose up from the depths, churning the sea, and Andromeda screamed in horror. Perseus quickly asked the king and queen: if he killed the sea monster, could he marry the princess? They immediately agreed, offering him rich rewards if he was successful.

As the slimy sea monster lumbered out of the water toward its prey, Perseus pulled Medusa's awful head out of its sack and held it up before the creature's eyes. In an instant, the giant monster was turned into stone. The crowd cheered and there followed great celebration throughout the land. The kingdom was safe again. So the triumphant hero Perseus married Princess Andromeda, and they lived happily ever after.

Forever, then, is the story re-enacted, night by starry night. Perseus holds the deadly head of Medusa beside Andromeda, who awaits his rescue. Pegasus flies through the heavens away from the king



ly around deep ocean natural of Pegasus on. Each n a differ This large on's many New Pat AFRICA: The s seen as The New reindeer brightest ns In The

## CETUS

### 1. KOBEUA and TUKANO OF BRAZIL:

A Jaguar. Rainstorms are frequent in the tropics, and to the Kobeua and Tukano, the jaguar personified the god of violent storms and hurricanes. (p. 34, The New Patterns In The Sky)

## CEPHEUS



PERSEUS

Finally, the Chinese saw not one but five constellations in what we call Perseus. Every autumn, flood season begins in China. To the Chinese, this group of stars included swollen waters, a celestial boat, a great trench (such as the dikes they built to control flooding), and a pile of heaped up corpses of executed criminals. The fifth constellation, Ho and Hsi, has a true story behind it.

Ho and Hsi were the personal astronomers of the Emperor of China. They lived a life of ease and luxury in the royal palace, while they were supposed to keep the emperor informed of any upcoming, celestial events. Well, the two astronomers got drunk one day and failed to predict an eclipse of the sun. When the eclipse took place, everyone was caught off guard. Now, solar eclipses were serious business

for the Chinese, who believed that a great dragon tried to gobble up the sun during such events. There was always much beating of drums, burning of incense, and shouting as the people would do their best to scare away the dragon. Naturally, these rituals always worked, for soon the sun would shine brightly again.

Now, on this particular occasion, the emperor and all the people were taken by surprise. Great fear swept the land as people scrambled to frighten away the dragon. After the crisis was over, the emperor angrily punished Ho and Hsi for their carelessness by having their heads chopped off. The faint cluster in what we call the head of Perseus represents to the Chinese the heads of Ho and Hsi, who would never again neglect their royal duties. (P. 160 161 Stars of Jade)

## URSA MAJOR

1. (IROQUOIS:) The Iroquois of the St. Lawrence River area and the Micmac natives of Nova Scotia said that each star of the Big Dipper was a different character. The characters of the story are:

THE BEAR:  $\alpha, \beta, \gamma, \delta$  Ursae Majoris bowl

THE PAN: Alcor

ROBIN:  $\epsilon$  Ursae Majoris

CHICKADEE:  $\zeta$  Ursae Majoris

MOOSE BIRD/COW BIRD:  $\eta$  Ursae Majoris

PIGEON:  $\gamma$  Bootis

BLUE JAY:  $\epsilon$  Bootis

OWL: Arcturus

SAW WHET OWL:  $\eta$  Bootis

THE DEN:  $\mu, \delta$  Bootis and Corona Borealis

The bear was being hunted by seven celestial hunters. Robin's star was called Robin because of the star's red color; Chickadee was smaller than the rest; Blue jay's star is blue in color; Owl, being a large bird, was the large star Arcturus; Saw whet was the smaller, red-headed owl; and Alcor is the cooking pan for the bear meat. Corona Borealis and its nearby stars were the bear's den.

One spring, when the great bear awoke from her long, winter hibernation, it came out of her den and began lumbering down the hill to find food. Chickadee spotted it instantly and called the other hunters. The seven hunters went after the bear,



and Chickadee brought along the cooking pan. Day after day, the hunters chased the bear, as the summer dragged on. As the summer gave way to the cool days of autumn, the hunters in the back began to lose the bear's tracks and gave up. Owl gave up first, followed by Blue jay, Saw whet, and Pigeon. Thus, these stars cannot be seen from October onwards. But Robin, Chickadee, and Cowbird were determined to catch the bear, and would not give up.

Midway into fall, the three birds overtook the bear. The bear reared up on its back legs to fight back, but Robin shot an arrow and killed the bear. Robin got confused, however, and flew too close to the bear and got covered with blood. Robin managed to shake off all but the spot on his chest, which is why robins have the red spot on their chests today. The blood he shook off stained the leaves of the forest, which is why trees turn bright, beautiful red colors in the fall.

Chickadee then joined Robin and together they prepared the bear meat and cooked it for dinner. This preparation took a while, and Cowbird decided not to arrive yet, but to let the other two do all the work. When the meat was finally ready to eat, Cowbird, who is the last star in the handle of the Big Dipper, arrived in time to share the food. Because of this, Cowbird was nicknamed He Who Arrives at the Last Moment. (P. 467-468 The Glorious Constellations)

2. (CELTIC:) To the ancient Celts, Ursa Major was Arthur's Wagon, the wagon of King Arthur of the Round Table. King Arthur's name comes from two Welsh words: Arth, which means bear, and Uthyr, meaning Luminous. The fact that Ursa Major travels around the North Celestial Pole in a circle may have been the original source of the legendary Round Table. (P. 468 The Glorious Constellations)

3. (CHINESE:) The Chinese called the Big Dipper the Winnowing Shovel. (P. 128 The New Patterns in the Sky)

Another Chinese story was that of Kuei, one of the stars in the handle of the Big Dipper. Kuei was a bright, talented young man who did very well on his literary exams. Now, the emperor was Wen chang, the god of literature. Wen chang was to award the person who scored the highest the much sought after Golden Rose. How

ever, in the presentation ceremony, no one had advised the emperor that Kuei had a deformed face. When the emperor started to give the rose to Kuei, he was so startled by Kuei's face that he accidentally dropped the rose, which shattered into hundreds of tiny pieces. Kuei was so upset by this that he tried to kill himself by jumping off a high cliff into the sea.

But as Kuei plunged underwater, the sea monster Ao came to his rescue, swimming under Kuei and lifting him above the waves. The sea monster carried Kuei all the way to the emperor's Jade Palace. The emperor welcomed Kuei with kindness and gave him the position of watching over the literary affairs of all the world. The bowl of the Big Dipper is the emperor on his throne as he speaks with Kuei and the others.

The second star from the bowl is Mr. Red Coat, the god who looked after the well being of students. He often helped students who had a hard time passing their exams. The third star is Mr. Gold Armour, the minister who searched for talented young people for positions in the government. Finally, there is Kuan ti, the god of war, who really prevented wars from breaking out. (P. 129-130 The New Patterns in the Sky)

4. (ROMANS:) These stars were seven oxen, ploughing the sky. (P. 127 The New Patterns in the Sky, P. 468 The Glorious Constellations)

5. (BABYLONIANS:) A wagon. (P. 126 The New Patterns in the Sky)

6. (SIOUX:) In central North America, the Sioux Native Americans saw a skunk. (P. 127 The New Patterns in the Sky)

7. (NORTH AFRICANS:) A camel. (P. 127 The New Patterns in the Sky)

8. (CHEROKEE:) Natives of the southern Appalachian Mountains saw three hunters in the handle of the Big Dipper chasing a bear that was the bowl stars. They chase the bear from spring to autumn, after which the bowl of the Dipper (the bear) dips below the horizon. When this happens, the Cherokee said that the hunters have killed the bear, but are still moving around. (P. 131 The New Patterns in the Sky)

9. (CHUCKEE OF NORTHEASTERN SIBERIA:) Ursa Major was a six hunters carrying sling shots and a fox chewing on a set of antlers. They have a poem about what they saw:



The Sun drives copper colored reindeer,  
But the reindeer that stand in the Pebbly  
River at night,  
The reindeer hitched to the sledge  
On the riverbank are silver.  
A white fox gnaws on some antlers,  
And the elk pursued by the hunters,  
The seal basking by the river,  
And the polar bear are white.  
The house of the Polar Star is rock crystal  
ice.  
A light burns on the roof of it.  
And the children who live in the land of  
the sky  
Coast on their sleds down icy hills  
When Eagle has scraped the clouds off  
them.

In this poem, Auriga is a sled pulled by the copper colored reindeer, while the five silver reindeer are the bright stars of Cassiopeia. Gemini is two elk (Pollux and Castor) running from the hunters. Delphinus is the seal, and Corona Borealis is the paw of the polar bear. The Polar Star is Polaris, the familiar North Star. And the children coasting down the icy hills of the sky are the stars of the constellation Auriga. The sled is the constellation Auriga, the reindeer are the stars of Cassiopeia, Gemini, Delphinus, and Corona Borealis. The polar bear is the constellation Corona Borealis, the seal is Delphinus, and the hunters are the stars of Gemini.

10. (AZTEC)

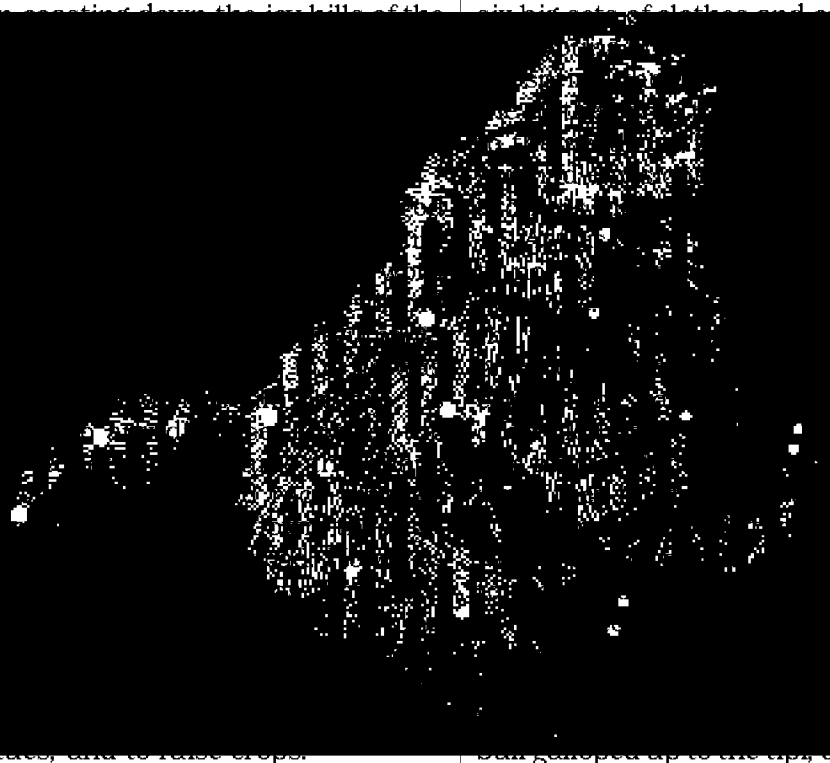
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statue, and to raise crops.

One day, Tezcatlipoca tried to destroy all the good works that Quetzalcoatl had done among the people. But Quetzalcoatl changed him into a puppet and put him safely up into the sky. Now Tezcatlipoca must dance forever, upright or on his hands upside down, depending on what position the constellation happens to be

in at that time. (P. 134 The New Patterns in the Sky)

- 11. (OSTYAK SIBERIA:) The big dipper was a moose. (P. 136 The New Patterns in the Sky)
- 12. (HAWAII:) The Big Dipper was called Na Hiku, which means The Seven.
- 13. (CHEYENNE:) Long ago, a Cheyenne girl who was an only child lived in a Tipi with her parents. Her mother taught her to sew buffalo and deer skin clothes. One day, the girl began making clothes for a man. She decorated the shirt and moccasins with bright colors in fine designs. When she finished, she began working on a second outfit. Her parents were surprised, and asked her why she was making the clothes. The girl answered that when she closed her eyes she could see seven brothers who lived alone far away in the north. They did not have a sister, and she said she would ask them to be her brothers.

Months passed, and the girl completed her outfit. Her mother was surprised to see her with her new outfit. She asked her why she was making the clothes. The girl answered that when she closed her eyes she could see seven brothers who lived alone far away in the north. They did not have a sister, and she said she would ask them to be her brothers.



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Just then, the six older brothers came back, and they were afraid when they were

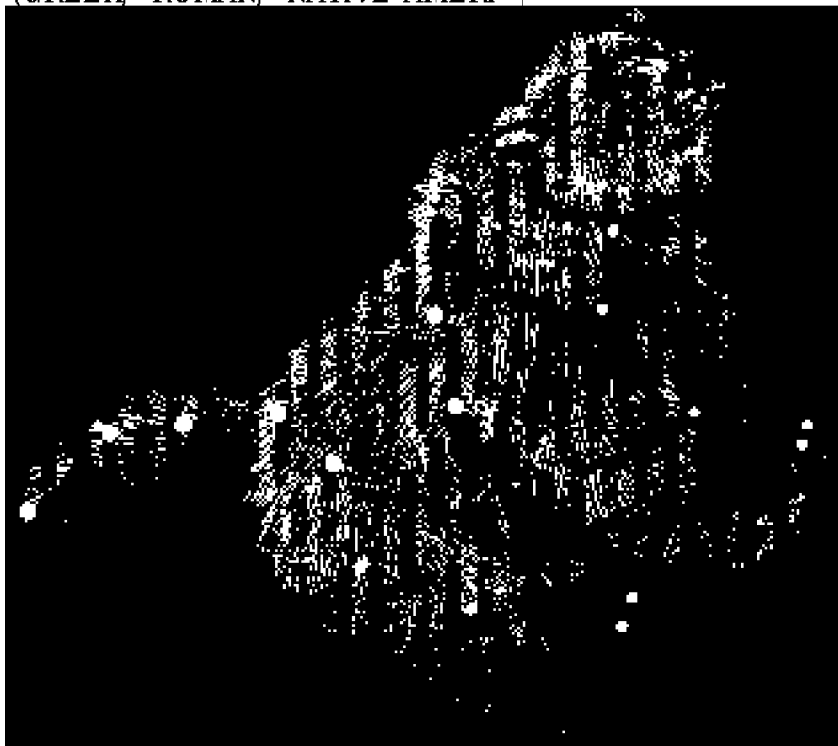
told what happened. Suddenly, they heard a deep rumbling. They looked up and saw a great herd of buffalo stampeding toward them. Just before the buffalo overcame the brothers, the youngest brother grabbed his bow and arrows and shot one up into the air. Instantly a tall pine tree appeared, and they all immediately began climbing it. The buffaloes caught up to the tree, and began ramming it with their horns, trying to knock it down. The youngest brother shot a second arrow, and the tree shot up higher, carrying them with it. As the buffaloes hammered the growing base of the tree, the youngest brother kept shooting up more arrows, making the tree shoot up higher and higher up to the stars.

At last, they jumped off the branches onto the star prairies above, where they still can be seen today. The brothers are the stars of the Big Dipper, shining brightly. The double star in the handle is the sister and her youngest brother. They are safe and happy now. (Her Seven Brothers)

#### URSA MINOR

1. (GREEK/ ROMAN/ NATIVE AMERI

- 2.
- 3.



ous Constellations)

4. (SPANISH:) A hunting horn. (P. 142 The New Patterns in the Sky)
5. (BABYLONIANS:) This was the Lesser Wagon. (P. 142 The New Patterns in the Sky)
6. (HAWAIIAN:) Polaris is Hokupa a, meaning Fixed Star.

7. (PERSIAN:) This was an exotic fruit called Myrobalanum, which comes from Indian almond trees and cherry plum trees. (P. 142 The New Patterns in the Sky)

8. (PAHUTE:) The North Star of the Little Dipper and the stars of the Big Dipper are characters in a story about Why The North Star Stands Still. Long ago, the Pahute Native Americans say, there was a strong, brave, sure footed mountain goat named Na gah. He was the son of one of the sky gods, Shinob. Shinob was proud of his son, and gave him two large, golden earrings to wear to make Na gah look impressive. Na gah lived among the high mountains, where he loved the challenge of climbing the most difficult peaks. Nothing was too hard or too high for him to climb.

One day, Na gah came to a mountain peak higher than any other he had ever seen. Na gah went around and around the base, looking for a trail, but could find no way up.

The walls were sheer ice, as glass, and taller than the highest cliffs he had ever seen. Na gah determined to find a way to the top. After all, what if Shinob happened to look up and see that his son couldn't climb it? Na gah would be ashamed of what happened, so he circled the mountain again and again, trying to find some small foothold or crack.

Sometimes he would find a few footholds, and would climb up, but then he would find a place where there were no footholds or crevices, and he would be forced to go back down again.

After a while, Na gah discovered a crack that led into a hole. Na gah entered the hole, which led downward at first. But as Na gah went, the tunnel turned and went up. Delighted, Na gah climbed with new energy. Up and up he went in the

darkness, feeling sure it led to the top.

As he climbed, many rocks started to come loose beneath him and fall back down the tunnel. A loud, thundering noise welled up from below as the rocks crashed to the bottom.

Na gah, who was hearing all this in complete darkness, grew frightened as he stumbled along. He finally decided to go back down and forget it all.

But soon he discovered that the falling rocks had sealed off the entrance to the tunnel. Now, there was no turning back. Na gah climbed and climbed, eager to get out of the darkness.

After much climbing, Na gah saw light in the distance. He was happy again now, for he knew he was almost out. At last, Na gah climbed out of the tunnel, and found himself standing on the highest peak he had ever stood upon.

The spectacular view almost took his breath away. He could see huge cliffs far below him all around. After drinking in this heavenly view, Na gah realized he would die here, because there was no way down. But he did find some grass and water to eat and drink.

Now, it just so happened that at this moment Shinob was walking all over the sky, looking down on the Earth, trying to spot his son. Shinob called to Na gah. Na gah called back, and Shinob saw his predicament. Shinob was upset, because he was unable to help his son get down. He did not want Na gah to die.

So Shinob turned Na gah into a star, the star that would be a guiding light to travelers around the world. He is called, Qui am i Wintook Poot see, the North Star.

At the foot of the mountain are seven other goats who see Na gah on top and want to climb up there themselves. They go around and around the mountain, always looking for a way up. These seven goats are the stars of the Big Dipper, which goes around and around the North Star. (P. 130-133 *Voices of the Winds*)

#### BIBLIOGRAPHY

1. Belting, Natalia, *The Stars are Silver Reindeer*. New York: Holt, Rinehart, and Winston, ©1966.
2. Chamberlain, Von Del, *When Stars Came Down to Earth: cosmology of the Skidi Pawnee*. Los Altos, CA: Ballena Press/ also the Center for

Archaeoastronomy, ©1982.  
CALL# E99 .P3 C47 1982

3. Cornell, James, *The First Stargazers: an introduction to the origins of astronomy*. New York: Charles Scribner's sons, ©1981.  
CALL# GN799 .A8 C67
4. Edmonds, Margot, and Ella E. Clark, *Voices of the Winds: Native American legends*. New York: Facts on File, Inc., ©1989.  
CALL# E98 .F6 E26 1989
5. Gallant, Roy, *The Constellations, how they came to be*. New York: Four Winds Press, ©1979.  
CALL# J398.26
6. Goble, Paul, *Her Seven Brothers*. New York: Macmillan, ©1988.  
CALL# J398.2
7. Mayo, Gretchen, *Star Tales: North American Indian Stories About The Stars*. Walker & Company: NY. ©1987
8. Monroe, Jean Guard, and Ray A. Williamson, *They Dance in the Sky: Native American Star Myths*. Boston: Houghton Mifflin Co., ©1987.
9. Ridpath, Ian, *Star Tales*. New York: Universe Books, ©1988.
10. Sesti, Guiseppe Maria, *The Glorious Constellations: History and Mythology*. New York: Harry N. Abrams, Inc., ©1987.
11. Staal, Julius D. W., *The New Patterns in the Sky*. Blacksburg, VA: The McDonald and Woodward Publishing Company, ©1988.
12. Staal, Julius D. W., *Stars of Jade*. Decatur, GA: Writ Press, ©1984.
13. Williamson, Ray A., and Claire R. Farrer, Eds., *Earth & Sky: visions of the cosmos in Native American folklore*. Albuquerque: Univ. of New Mexico Press, ©1992.  
CALL# E98 .A88 E18 1992

took turns making some terrific meals in the kitchen! The site in Franklinville, NY, a small town located north of Olean, NY, is terrific on a clear night for stargazing, however, as luck would have it, it was cloudy all weekend. The participants had such a terrific time getting reacquainted and meeting each other's children that no one minded the really lousy weather.

I also went observing in July in California, on top of Fremont Peak, where members of the Northern California Astronomical Society have built their own observatory by pulling resources together. The telescope inside is a 30 inch Dobsonian. The club is not content with this telescope and is in the process of building a new one of 70 inches! They even had to build a machine to grind the mirror. They were in the process of mirror grinding during my visit.

It was a crystal clear night for observing during my visit to the Peak and I snagged a much better view of Saturn and Comet Hale Bopp and went cruising the Milky Way with binoculars. It was so nice that I remember Venus being high in the sky when I finally packed it in and put the telescope away.

On a non astronomy adventure in August, I also went to Hamilton, Ontario, Canada to volunteer at the largest free music festival in North America. I work in the Arts & Craft Hospitality Tent and have been attending the festival ever since I was a college student. This year it was great to see closing act Spirit of the West. I'd seen them several years back and it was interesting to see how they have grown musically since then.

Speaking of music, that September day that Hurricane Fran blew in, I was on my way to see a Blues Music Festival at Wolftrap with trees falling and roads flooding and power lines falling. It was worth risking life and limb, however, just to see Kenny Wayne Shepherd jam with B. B. King! Wow! Did anyone's facility suffer from the hurricane? Hope not!

Just got in a WV Mountaineer's postcard from my former planetarium assistant Frank Aliveto. Attending West Virginia University, he claims that light pollution is terrible in Morgantown and that I should write and send brownies, I never get any mail! Frank, you've only been gone a week! No one has had time to miss you yet! Maybe I can trade those brownies for an autograph from Famous Amos, football star from WVU. Well, I'll give it a shot.

What did you do this summer? What is happening now? Call, write or fax and let me know.

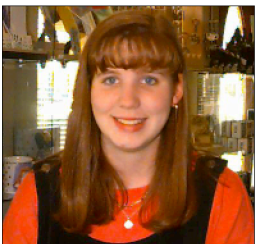
POSTSCRIPT: For those of you who were kind enough to share with me your experiences on use of volunteers and interesting stories about them, I will be using them in a future column, so there is still time to contribute any information you may have. Also the high school that my planetarium is located in, will be starting a new program called Schools That Work with more emphasis on readying students for careers. Is there anyone within reading distance who is or has done something similar?

I'm readying material for a proposal on use of the planetarium for this program, please send me any information or material that might help me put it together. Thank you!

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## The Invasion of Mars

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Nicole Hassold  
Junior Intern  
Craigmont Planetarium  
Memphis, TN

NASA believes there may be life on Mars. Scientists will soon launch the second of several exploratory missions to examine the surface of the red planet. On the heels of the Global Surveyor mission launched in November, Mars Pathfinder will investigate the question, Are we really the only life forms in our galaxy?

Mars Pathfinder consists of two parts, a stationary landing pad and a surface rover, Sojourner. The rover is a six wheeled vehicle which rides on a rocker bogie sus

pension. Sojourner will be transported into space inside the stationary lander, and, upon reaching the surface of Mars, it will roll down a deployment ramp and begin its explorations.

An Earth bound operator will control the rover. The rover systems will take black and white pictures. Then the rover will forward those images back to Earth.

Scientists hope to acquire several images of the rocky terrain of Mars to study the size and distribution of the rocks

# Astro-Video Review

## The Science of Star Trek

With exciting graphics and video, *The Science of Star Trek* boldly goes where no PBS special has gone before. Host Bill Kurtis takes us behind the scenes of *Star Trek* and tells secrets never before revealed. The video shows how science fiction paves the way for science fact. Warp Speed is currently being worked on by physicist Stephen Hawking.

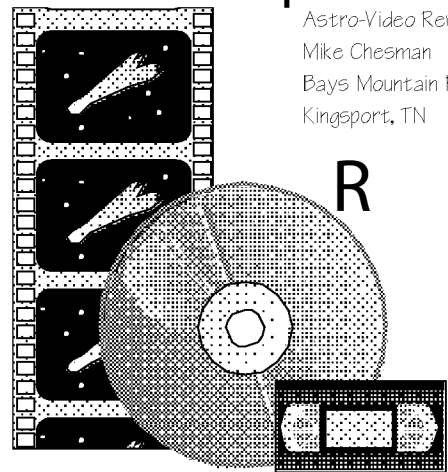


Call 800 942 0528 to order the \$39.95 PBS video *The Science of Star Trek*.

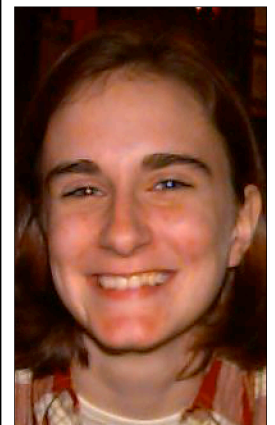
Android Commander Data has been constructed with artificial muscles one half the diameter of a strand of hair. These muscles are so strong that a full size robot made of them would be 100 times as powerful as a man. *Star Trek* is quickly becoming a reality virtual reality, that is. With the use of VR, one can imagine he has stepped into the Holodeck aboard the Enterprise.

Kurtis reveals the Enterprise is out of proportion. Storage for propellant is hardly enough for a ship of its size. Even if anti matter were being used, there is no room to produce it. Anti matter may never become a reality. It would take over one million years to produce  $\frac{1}{1000}$  of a gram of anti matter.

NASA engineer Carol Stoker says NASA is constantly striving to achieve what *Star Trek* already has. Staying one step ahead of NASA keeps *Star Trek* technicians busy. This is by far the most exciting documentary to date. It is slightly depressing, for we have many more years of research to do before we ever launch our own Deep Space Nine.



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

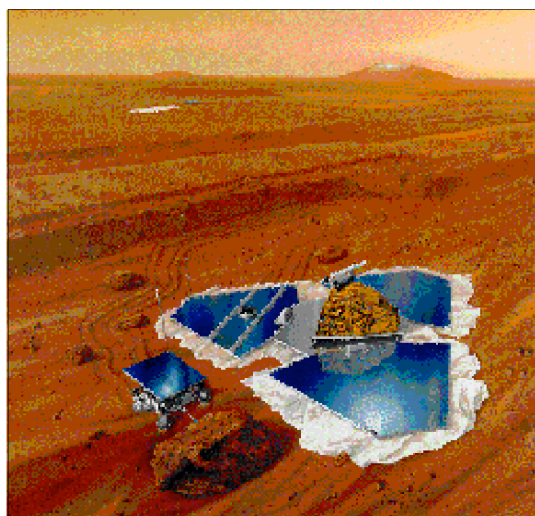


Elizabeth Shelly  
Senior Intern  
Craigmont Planetarium  
Memphis, TN

and soil. They want to learn the specific locations of some the larger features of Mars as well. Scientists will also study Sojourner's tracks made on the Martian surface to estimate some of the Martian soil properties.

Pathfinder was launched December 2 and will land on Mars on July 4, 1997. Keep your eyes and ears peeled for information about this mission, and keep those Reese's Pieces ready for E.T.!

After a soft landing courtesy of air bags, the Pathfinder rover will drive down a small ramp to begin its exploration of the surface of Mars.



The Invasion of Mars  
continued

# Evolution of Planetary Atmospheres, part 2

Dennis Joseph Cowles  
Louisiana Nature Center  
New Orleans, LA

A paper presented at the  
1996 conference of the  
Southeastern Planetarium  
Association  
June 19, 1996

## The Differentiation of Atmospheres

As we saw above, the atmosphere of a planet is the result of a tug of war between Newtonian gravity and the Kinetic Theory of Gases. Two planets, even if they begin with identical atmospheric compositions, will become differentiated over time if the conditions are slightly different on each planet. A good example of this differentiation can be seen in Venus and Earth.

Both planets have similar masses and thus have similar escape velocities. Soon after formation, the two planets were probably very similar. Both planets have the same chemicals in their atmospheres, but in differing amounts. This may not have always been the case.

Initially, the only difference between Venus and Earth was distance from the Sun. They formed in the same neighborhood and it is reasonable to expect that they would have similar gases trapped in their rocks. The difference in distance from the Sun will translate into a difference in temperature. Venus is closer to the Sun and is therefore hotter than Earth. Higher temperature corresponds to faster molecules. Venus lost its light gases at a much faster rate than Earth. This increased the proportion of greenhouse gases in the atmosphere (like carbon dioxide) led to even more heating. The heat drove gases out of the rocks on the surface at a faster rate, increasing the pressure and creating still more heat. Eventually equilibrium was reached between the energy entering the atmosphere and the heat radiating out into space. The equilibrium temperature at the surface of Venus is now 740 K and the surface pressure is some 92 times the pressure of the Earth at sea level.

On Earth, the light gases were lost at a slower rate. As life emerged in the oceans, it changed the atmosphere in many ways. Photosynthesizing organisms use up carbon dioxide and release  $O_2$  into the atmosphere. The oxygen plays many different roles on Earth: oxidation of rocks on the surface, shielding the surface from ultraviolet radiation through the formation of ozone, and joining with  $H_2$  to make water. Photosynthesis is also important for another reason: it locks away carbon

dioxide that would otherwise be floating around in the atmosphere and absorbing heat. Photosynthesis helps regulate the temperature.

The planet Mars has evolved considerably since it formed. There is abundant evidence that liquid water once flowed across the surface. For this to occur, Mars must have had a much thicker atmosphere than it has now; water cannot exist on Mars now in the liquid state—the pressure is way too low and it is way too cold. Liquid water on Mars immediately vaporizes. Mars' original atmosphere was probably fairly dense, enough to allow water to exist in the liquid state. Mars is a cold planet (since it is farther from the Sun) so the molecules do not move around as fast as they do on Earth. However, Mars does not have enough mass to retain most gases indefinitely. They will leak off into space eventually. Mars has been slowly losing its atmosphere to space throughout the history of the solar system.

Jupiter has enough mass to create a core of metallic hydrogen in the center of the planet. This core keeps the gases from sinking down into the center of the planet but does not exclude heavy metals. There may be a core of heavy, rocklike material surrounded by hydrogen that is in a liquid metallic state deep inside Jupiter.

Saturn is massive but not massive enough to create the tremendous pressures to compress hydrogen into a liquid metal. Every compound seen in Saturn's atmosphere has been seen in Jupiter's. The helium does not seem to be as abundant in Saturn as it is in Jupiter; since Saturn does not have metallic hydrogen in its core that will exclude it, some of the helium may have migrated toward the center of the planet.

Uranus and Neptune may have large ionic oceans that have dissolved gases in them. This model neatly explains the observed compositions of the atmospheres of these two planets.

## Isotopes: Clues to Atmospheric Evolution

Chemical elements are not exactly the same; the number of protons in the nucleus is constant but the number of

neutrons is not. Elements with differing numbers of neutrons are called isotopes. The isotopes of an element have identical chemical properties but slightly different masses. This mass difference can become important when considering atmospheres. Recall that the  $v_{\text{RMS}}$  equation has a term for the mass of the molecule. Heavy isotopes have a slightly lower RMS velocity than light isotopes because the heavy isotopes are more massive. I will examine the isotope ratios seen on Mars to illustrate the use of isotopes as tracers for atmospheric evolution.

Mars has gaseous nitrogen ( $\text{N}_2$ ) in the atmosphere. Nitrogen comes in two common isotopes:  $^{14}\text{N}$  and  $^{15}\text{N}$ . If nitrogen is broken apart in Mars upper atmosphere by energetic UV from the Sun, it is slightly more likely that  $^{14}\text{N}$  will escape than  $^{15}\text{N}$ . The ratio of  $^{15}\text{N}/^{14}\text{N}$  measured by Viking is 1.6 times the measured ratio for the Earth. If we assume that the original ratio was similar to that of the Earth, we have to account for the shift in this ratio at Mars. To use the preferential loss of light isotopes as the cause for the shift in the isotope ratio implies that Mars originally had an atmosphere that had a lot more nitrogen. In fact, it means that Mars has lost 90% of its nitrogen. This has further implications. The ratio of carbon to nitrogen on Earth is 24; if the value for Mars was similar then Mars originally had a lot more carbon. Inert gases are heavy and are not easily lost to space. You can check this yourself. Find a periodic table, and run the numbers.

We can estimate the abundances of inert gases originally present inside planets by measuring the amounts that we find in gas poor meteorites (from which the terrestrial planets formed, remember) to arrive at an average mass of inert gas per kilogram of rock. We can use this average to estimate the amount of outgassing that has occurred to a planet.

We can estimate the total mass of the atmosphere, and since we know the percentage of the atmosphere that is inert, we can solve to find the total mass of the inert gas. We can estimate the mass of a planet and determine from the average mass of inert gases per kilogram of rock how much inert gas would be in the atmosphere theoretically if all of the gases trapped had been released into the atmosphere. Comparing these two numbers gives us the extent of outgassing that has occurred.

One potential problem in using this to

evaluate atmospheres is that inert gases are known components of the solar wind. Venus shows much higher levels of almost all of the inert gases than either Earth or Mars. This could be an effect of extensive outgassing, or it could be an effect of its location closer to the Sun. When Venus was forming out of the solar nebula, it could have captured most of the inert gas coming out of the Sun, preventing it from reaching Earth and Mars. Venus is not enriched in the isotope argon<sup>40</sup>,  $^{40}\text{Ar}$ . Argon<sup>40</sup> is produced from the radioactive decay of potassium. Since the other inert gas levels at Venus are much higher than those of Earth, we would expect that the  $^{40}\text{Ar}$  level would be similarly high. Since it is lower, it has been suggested that Venus may be deficient in potassium or that the release mechanism for  $^{40}\text{Ar}$  is not very efficient. If the release mechanism is inefficient for  $^{40}\text{Ar}$ , then it is similarly inefficient for the other inert gases; the elevated inert gas levels must be due to the solar wind and Venus is not extensively outgassed. If Venus is deficient in potassium then we have another constraint for our models of the formation of the solar system. Another possibility is that the inert gas levels may be a combination of both outgassing and solar wind activity. We do not yet know enough about the surface chemistry of Venus to distinguish between these possibilities.

Mars is depleted in inert gases relative to Earth. This indicates that Mars still has a lot of gases trapped in its interior; i.e., Mars is less outgassed than Earth. If Mars undergoes another round of volcanism, some of those gases will be released.

### Conclusion

A few, final words about the velocities of molecules. There is a lower limit to the velocity zero, but the upper limit is the velocity of light,  $c$ . The RMS velocity gives us the most probable velocity within the range from zero to  $c$ , but it does not imply that there are no molecules travelling close to zero or close to  $c$ . If we could grab a single molecule out of a sample that is at a given temperature, it would conceivably have any velocity between zero and  $c$ . If we could grab 10 billion molecules instead, most of them will have a velocity close to the RMS velocity for that gas at that temperature, but some of them will be much closer to zero or much closer to  $c$ . The RMS velocity

(continued on page 24)



# News from SEPA States

Bishop Planetarium, Bradenton  
[Part of the text file was missing. Sorry George. This is all that was left Ed.]

... Laser shows continue to run every Friday and Saturday evening at 9:00 p.m. and 10:30 p.m. Two different shows are featured each week. We still are striving for complete ILDA compatibility and are hoping to eventually make laser shows available for purchase.

George Fleenor  
Bishop Planetarium  
Bradenton, FL

Alexander Brest Planetarium,  
Jacksonville

Patrick McQuillen says the Alexander Brest Planetarium is currently running Our Place in Space from the Sudekum Planetarium in Nashville. It has been well received.

Both the Planetarium and Museum were open the evening of the total lunar eclipse from 8 p.m. to midnight. Over 900 visitors came out to view the eclipse, Saturn, and Jupiter through our telescopes; learn all about eclipses in the planetarium and view Moon rocks on loan from KSC after each program; and eat moon pies that a local supermarket donated for the evening. Each visitor got a free moon pie to eat. You could say we mooned everyone that night. I also got two of the three major local TV network weathermen to eat moon pies during the weather spots shot live at the planetarium that evening. I showed how the Earth's shadow would take a bite out the bright Moon, then we raced to totality. (It is really hard to talk on air with your mouth full of moon pie.)

Orlando Science Center, Orlando

Paul Trembly writes that work progresses on the New Orlando Science Center with the installation of our Iwerks 15/70 projector, Digistar II, and Spice automation system. The official theater name is the Dr. Phillips Cinedome. With everything staying on schedule, we should be almost completed by the end of October. Public opening is February 1, 1997.

With the completion of the Digistar installation, we are now the world's largest Digistar facility. We are happy to report the images are bright, crisp, and awesome on our eight story dome!

In the current facility we are running Death of the Dinosaurs in conjunction with our main exhibit Project Dinosaur. This is our last traveling exhibit before the current facility becomes extinct.

This will be the last report from the John Young Planetarium. When next you hear from us we will have moved into our new facility and be sporting our new Cinedome name.

The Museum of Arts and Sciences, Daytona Beach

Roger Hoefler, Curator of Astronomy, announces the fall FLOR PLAN meeting will be held at the Museum of Arts and Sciences Planetarium on Saturday, December 7 from 10:00 a.m. 3:00 p.m. Mark your calendars; you will receive more information later!

The planetarium at the Museum of Arts and Sciences is currently featuring the Loch Ness program More Than Meets The Eye as the regular public showing, and will feature Tis the Season during the holidays. During the time Comet Hale Bopp will be visible next year, the planetarium will feature Adler Planetarium's program Comets are Coming, enhanced with a live presentation featuring the latest photos of the comet. Since the total eclipse of the Harvest Moon began with the Moon so low in the southern sky, the local tree line prevented eclipse activities at the planetarium, but the local members of the Central Florida Astronomical Society and the planetarium staff held an eclipse watch utilizing 12 telescopes at a city park down on the waterfront. An estimated 500 people attended, with an amazing number that stayed there during the entire eclipse. A windy, but otherwise good evening of observing was enjoyed by all.

This school year's schedule of programs for Volusia County Schools is nearly full and packed tighter than any previous year. At the end of the 1990-91 school year when Roger assumed duties at the Museum of Arts and Sciences as Volusia County School's planetarium curator, there were about 46,000 students enrolled in the system. This year they have nearly 58,000 enrolled, and more coming

every day. Needless to say, demand for the available programming times at the planetarium has also increased. The entire 96-97 school year is almost completely filled as of this writing.

Indian River Community College,  
Fort Pierce

Jon Bell from Hallstrom Planetarium in Fort Pierce, Florida, reports that they had a pretty good turnout for the September 26 lunar eclipse—roughly 500 people visited the Planetarium and Indian River Community College's Science Center, and got to look through the eyepieces of a couple of dozen telescopes that had been set up on the darkened police driving range behind the college.

The telescopes were provided by the Planetarium and by the Treasure Coast Astronomical Society, which came out in force to handle the crowds. The biggest telescope was Queen Cassiopeia, a 20-inch Dobsonian, which by Jon's count, never had less than a hundred people on line throughout the event.

Spectators could watch the lunar eclipse, or Saturn, Jupiter, and a couple of other deep sky objects, and attend one of Jon's question and answer sessions between major events. An eclipse effect was also projected onto the planetarium dome in case of cloudy weather, but the skies were fairly clear, and a great time was had by all.

The Hallstrom Planetarium's next program will be What's New in Outer Space? It will be a live, interactive show wherein Jon will talk about some of the most recent cosmic discoveries. That show will be followed by Star of Wonder at Christmas time and Comets Are Coming in the winter.

Saunders Planetarium, Tampa  
The Saunders Planetarium at the Mu

seum of Science and Industry in Tampa has gone through some dramatic changes. In June, the planetarium was closed to complete a \$150,000 renovation funded the State of Florida and The Saunders Foundation. After 6 weeks of work the planetarium reopened with its new face lift. The planetarium was the standard mid-1960s installation that was originally built on the campus of the University of South Florida over 30 years ago. The renovation added a projection booth, a light locked entrance/exit, epicentric seating, triple the number of slide projectors, a Bowen Productions designed digital audio system, an ECCS control system and cove lighting system, and a Sony 1252 data/video projector.

We reopened with Planet Patrol as our family show and Just Imagine as our adult show. At the equinox MoonWitch became the family show. This season will begin on Thanksgiving with Comets: From Fire to Ice to open near the solstice.

The September 26 total lunar eclipse was a fantastic success with nearly 600 visitors crowding the top of the MOSIMAX for telescopic views of the eclipsing Moon, Saturn and Jupiter. For \$5 visitors were able to visit the MOSI, see Moonwitch, and the IMAX movie Destiny in Space.

Finally, staffing has changed slightly. Al Peche is now head of the Space Theater Division that includes The Saunders Planetarium, the MOSIMAX IMAX DOME Theatre, and the GTE Challenger Learning Center. Craig MacDougal, who recently became a planetarian, has become the Planetarium/Challenger Specialist responsible for the day to day operations of the GTE Challenger Learning Center and The Saunders Planetarium.

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Savannah Science Museum, Savannah

Erich Landstrom reports in Savannah, Georgia, over 300 people turned out for our star party on Thursday, September 26th, Harvest Moon in Hiding. The Chatham County Board of Education opened the observatory at the Oatland Island Education Center, so telescopes and binoculars were pointed at the eclipsed Moon, Saturn, and Jupiter. The weather was perfect, even after the clouds rolled in at midnight: thin, high clouds would have formed a complete 22-degree halo around the Moon, except that

where the Moon was still eclipsed, the circle was broken. As more of the Moon emerged, more of the circle was completed, until both ends were touching when the Moon exited from shadow. We hope for strong turnouts for our star parties in November (Star B Que) and March (partial lunar eclipse/Comet Hale Bopp viewing).

Our new classroom in the museum is completed, just in time for the surge in school groups. Incidentally, the downtown facility the Museum had anticipated moving into has instead been purchased by the

News from SEPA States  
continued

George Fleenor  
Bishop Planetarium  
Bradenton, FL

Erich Landstrom  
Savannah Science Center  
Savannah, GA

Savannah College of Art and Design for a college library. The search continues...

Under the dome, I am pleased to announce we have been selected by the Henry Buhl, Jr. Planetarium to receive free one of 50 planetarium show kits for Journey Into The Living Cell provided by a National Science Foundation grant. We will premiere it Summer '97 in conjunction with our new exhibit, Brain Matters.

Presently, for the school year, classes can schedule from a wide choice of prior public shows and popular school offerings; a five fold increase over last year. Other than that, we are working with the Savannah Symphony Orchestra to develop an in house show (or two) on the physics of sound and Gustav Holst's composition The

Planets. With Galileo at Jupiter, Cassini going to Saturn, Pathfinder heading to Mars, and the Pluto Express in the offing, we're drafting a program tentatively titled Probing the Planets. Time permitting, I plan on reworking our holiday program Stars of Wonder, Stars of Light into a more colonial American Christmas show.

Finally, the StarWatch radio segment is now being broadcast twice a day. Museum intern SueSon Chan splits 70/30 the chore of writing the scripts with me, and I hope to have her start recording some of her segments as well before she leaves in December. Happy Holidays, everyone!

Erich Landstrom  
Savannah Science Center  
Savannah, GA

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Freeport McMoRan Planetarium and Observatory, Kenner

Due to several factors in the city of Kenner, I still have no news on the possible building of a new planetarium. As I reported last issue, the current mayor and council of Kenner decided not to act upon the building of our new facility. Unfortunately at this time, no decision has been made. We are however installing a new video projection system and plan on adding several special effect projectors in the near future. Currently our facility is showing Bowen Productions Moon Witch and our Sky Tonight presentations.

The Science Center worked closely with the local Pontchartrain Astronomy Society, for the night of the eclipse on September 26. Things worked out really well. We had several hundred people show at both locations where we offered presentations and telescope viewing. We also got underway with our highly successful Young Astronauts Program and enrollment has exceeded one hundred.

I also know most of you who have read this column have seen this before but we are continuing work on our space station exhibit. Unfortunately different alterations to this exhibit continue to make an exact opening date unknown.

I also helped at the 14th annual Deep South Regional Stargaze held at Percy Quin State Park near McComb, Mississippi in mid October. Also recently I was able to finally put together a directory of astronomy related facilities in Louisiana. To get a copy or to be included in the next edition, contact me at (504) 468 7229.

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Louisiana Nature and Science Center Planetarium, New Orleans

Mark Trotter and Dennis Cowles are currently showing The Sky Tonight, The Family Laser Show, and Loch Ness Productions updated Mars Show. Still running is Sudekum Planetarium's excellent Planet Patrol: A Solar System Stake Out for school groups. A new laser show has been added to the line up, Best of Pink Floyd, which joins Metallica, Pink Floyd's Dark Side of the Moon, The Wall, and the Alternative Laser Show in regular rotation. Currently being produced is a techno industrial laser show, LaserRave.

Mark is fighting the budget demons again and Dennis is putting the finishing touches on the Hale Bopp program. Mark conducted several astronomy workshops for teachers; his is also training some of the education staff to use their Starlab for outreach. For the September lunar eclipse, they had several telescopes available for public viewing and they ran the Dark Side of the Moon laser show as well.

Mark is continuing to acquire research materials for his Apollo Adventures show, including 80 hours of video from Washington University in St. Louis of the Apollo moonwalks and miscellaneous materials from the Lunar and Planetary Institute in Houston. Dennis is researching geological aspects of Apollo landing site selection.

They finally managed to cajole the Powers That Be into coughing up some money for planetarium repairs. The seats needed some attention, as did the front wall, which was damaged during a Metallica laser show when some enthusiastic audience

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

members started a mosh pit.

The Dome Gnome is managing to keep the planetarium relatively free from the interference of those nasty electromechanical gremlins. Finally, Mark and Dennis are sad to announce the loss of their friend and planetarium security guard, Joe Lovett, to the United States Coast Guard. Semper paratus, Joe.

#### St. Charles Parish Library Planetarium, Luling

Gary Meibaum informs us that this summer has been an eventful one. The good news is that our library addition project has been completed. No more pile drivers, hammers, saws, and the like. The bad news is we are replacing the roof on the rest of the building. As I write, the project is going into its fourth month. Since the fresh air intake for our air conditioning system is on the roof, well, you just can't get away from it. Nothing like the smell of fresh hot tar to lend atmosphere to a sky show.

Our principal show for the summer was The Mars Show from Loch Ness. This updated version worked quite well in our 20 ft. dome. Our Saturday children's matinee continues to be Larry Cat in Space.

This show works well, but it is now time for a change. I will be installing The Cowboy Astronomer this fall.

Attendance has been slow but steady. We are all bracing ourselves for the upcoming comet mania due next year. Hope our south Louisiana weather cooperates better this time.

#### Natural History Museum Planetarium, Lafayette

Dave Hostetter reports that the planetarium had a very successful National Aviation Week with activities and cooperation from the local airport. Also in the works is the Annual Native Crafts Festival with solar viewing and planetarium shows for the public with over 10,000 people expected for this two day event.

The shows running at this time are Planets, Planets Everywhere which is a live presentation that provides information about extrasolar planets and Through the Eyes of Hubble which began on October 8.

A local architect has been selected for the new downtown museum. Also the museum has hired a new director, Joe Hays, formerly of the Museum of the Great Plains in Lawton, OK.

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#### Russell C. Davis Planetarium, Jackson

Bruce Robertson writes that he would like to thank the staff of the Sudekum Planetarium for a wonderful Southeastern Planetarium Association Conference. This was his first SEPA conference, and it was his first chance to meet many of us as well as a great learning experience. He is looking forward to seeing everyone again.

The Russell C. Davis Planetarium enjoyed an especially busy summer. The facility entertained many out of town visitors thanks to a spectacular exhibition on The Palaces of St. Petersburg operating nearby.

Public and laser programming included Hubble Vision, The Secret of the Cardboard Rocket, A Part of HIStory, The Dark Side of the Moon, and Wish You Were Here. Space Day on July 20th commemorated the Apollo 11 lunar landing and celebrated the completion of Student Space Station™ Mission 96 A.

A Red Moon Party on September 26th attracted some seventy people and three network affiliate news crews for a Theater

program and rooftop observing. In autumn the Davis Planetarium Theater will feature Adler Planetarium's Comets Are Coming along with Mueller Planetarium's Halloween, Aerosmith, and R.E.M. laser programs. Backyard Astronomy classes in November will highlight the approach of Comet Hale Bopp.

#### Rainwater Observatory and Planetarium, French Camp

As if they didn't have enough telescopes there already, the Rainwater Observatory and Planetarium in French Camp received a Celestron C14 telescope donated by a retiring Mississippi park ranger. Director Jim Hill and several volunteers are constructing an observatory to house it. They have also been experimenting with a donated low light security video camera which has a 4.5 Fujinon zoom lens.

And I heard him exclaim ere he drove out of sight, Stellar Christmas to all and to all a dark night!

News from SEPA States  
continued

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

Bruce Robertson  
Russell C. Davis Plan-  
etarium

Todd Slisher  
Gibbes Planetarium  
Columbia, SC

On September 16 a special event took place in Columbia. The first ever (or at least the first we could ever remember) meeting of South Carolina Planetarians was held. Attending were groups from Aiken, Rock Hill, Columbia, Ladson, and Charlotte. OK, yes, Charlotte isn't exactly in SC, but it wasn't a formal enough meeting to split hairs.

The purpose of the meeting was to increase communication among the planetarium community and try to discuss ways to advance astronomy education goals. Many good suggestions were made, and I believe the meeting was fun and productive for all.

The group even adopted a quasi official name. S.C.O.P.E. South Carolina Organization of Planetarians and Educators. It was agreed to meet annually on the first Monday after Labor Day.

#### Dupont Planetarium, Aiken

The big news here is the departure of Jim Mullaney, the current director of the planetarium. Jim has decided to move back near his roots and family in Pennsylvania. There he will concentrate on writing, lecturing, and consulting in the field of astronomy.

Jim contributed a lot to the planetarium in Aiken, literally being a one man show from the opening of the planetarium last year. He has lectured, educated, and inspired all types of groups from the smallest children to facility administrators. Along the way he oversaw the tuning of the world's third Digistar II, improving the star field for all future users to come. We all wish Jim the best of luck in his future endeavors.

Jim's accomplishments continued on into the fall, holding a 600 person lunar eclipse watch in cooperation with the Astronomy Club of Augusta. The planetarium is currently showing Through the Eyes of Hubble and live sky programs. They also hope to hold a telescope clinic for interested residents.

#### College Park Planetarium, Ladson

It seems that I have been amiss in previously not including a very exciting planetarium program on the eastern side of the state. Carol Day runs a 5.5 meter facility located at College Park Middle School. The facility uses a Spitz 373 and other equipment to educate and excite many of the area's school children.

Carol currently adapts several shows for different age groups. Among these are Fall Starwalk for 3rd and 5th grades and The Explorers for 6th and 7th grades. Also Carol is assisting in helping area 4th grade teachers adapt to a new curriculum that now includes seasonal constellations.

The area's students were also involved in projects that centered on the recent lunar eclipse. Many of the 7th graders filled out observation sheets, timing the eclipse. These were later sent to Jack Horkheimer as part of his project. As a project, one of the group even videotaped the event.

Many of the children were simply stunned by the beauty of the eclipse, watching all or most of the Moon's passage through our shadow. Carol tells an amusing story of one young girl which fell asleep in a lawn chair, only to be awakened by her parents about 2 a.m. when she didn't come back inside from her eclipse viewing.

#### Gibbes Planetarium, Columbia

Here in Columbia we are in the midst of a transition. Director Jeff Guill is transferring most of his time over to the State Museum to work on the new planetarium project. This has created a bit of a change in staff while keep the current facility running and plan for the new facility. Todd Slisher will become Planetarium Manager of the current facility while Bryant Siegfried will be promoted to a full time Planetarium Technician post. We have also just hired a new staff member to fill Bryant's old position as weekend Console Operator. USC student and member of the Midlands Astronomy Club Matt Polkowsky will be filling this role.

During this time we have certainly not been slowing down. Ghosts and Goblins make a reappearance in The Nights of Halloween. November will feature the Loch Ness production More than Meets the Eye in conjunction with a special observing sessions of Comet Hale Bopp and other objects at the Melton Observatory. Season of Light follows as the Christmas season approaches. Work also continues on an original comet program for next spring. Of course we continue to run school shows during the fall. Outreach efforts this fall include telescope viewing at the State Fair and several programs at area schools in conjunction with the Midland Astronomy Club.

### Sudekum Planetarium, Nashville

Here at the Sudekum Planetarium in Nashville, it seems like we have been swamped since the conference, but at the same time, there doesn't seem to be much to show for it. During the summers, the Planetarium is open seven days a week plus provides support for museum science camps and day camps. On top of all that, our astronomy educators, Sharon and Waylena, took some much needed and well deserved vacation.

September was spent preparing for the new school year, installing a new, basic, preschool show, and taking care of annual maintenance. Of special note was the star party scheduled to observe the total lunar eclipse. The sky was 100% overcast, but the clouds were thinner in some places. Surprisingly, more than 500 people came out and actually stood in line to look through telescopes at the diffuse moon that could be seen and occasionally peeked out from behind the thin clouds. In October, groups started coming to the museum, and starlab went out on a few dates. Kris was on vacation the last two weeks of October, worked half time the first week of November, and then went to Boston for the annual meeting of the informal science education planning group for the Hands On Universe project. Sharon also went to Boston to help develop activities that use and complement the image processing software. This should be available nationwide in the next two years hopefully.

Moonwitch and Galaxies were the featured programs in the fall. A Christmas Story plays until Christmas Eve. Our Place In Space and Adler's Comets Are Coming! will play through the spring. There is no record breaking attendance to report and no monumental event to announce. It has just been very busy doing the usual Planetarium stuff.

### Craigmont Planetarium, Memphis

In the beginning it was a planetarium show! Then, slowly inch by inch, step by step it turned into a Mega Web page! We entered the Think Quest contest and began a new journey into cyberspace. Our students Riki Haley and Stephanie Lim from Memphis along with Andrew Holbrook from Madison Wisconsin created an educational Web page The Online Planetarium Show (TOPS) that can be easily used in curriculums across the nation.

The Think Quest contest has got to be one of the most memorable experiences in my life. Along with meeting all the other contestants I got a chance to meet their coaches and pick up some tips on how to improve our entry for next year. Another of the most gratifying things we encountered was to meet the rest of our team Andrew Holbrook and his coach Geoff Holt for the first time. After working with them via telephone and e mail it was great to finally meet them in person. We have already made many plans for next year and are excited to be working together.

Oh, I guess the real stuff that you want to know about is what happened when we got to Washington. We were greeted at the airport and stayed in a first class hotel. I couldn't believe it... there was even a telephone and television in the bathroom (like I would want to answer it.) To continue, that night all the contestants and their coaches got together for a get aquatinted party. There was everything there you wanted to eat and more. I loved that part! The Think Quest staff had many warm up activities planned including one where you made a circle, got real close front to back and sat in the persons lap behind you. This took a lot of trust because you didn't even know the person who's lap you were sitting. We did fine until they asked us to sit on each others laps and the walk together. It seems that the trust was beginning to fade at that point. It was great and we all had a good time.

As for the days and nights to come we were motivated by speakers, fed, motivated some more, fed, and taken on tours around Washington and came back to the hotel for more food. One night after the judging was over we went to the banquet hall to find a wonderful playground to let off all our stress. There was human bowling, jousting on mushrooms, sumo wrestling, big glove boxing and more for us to enjoy. We along with our students had a most terrific time!

The next night was the Awards Ceremony. Tension built as we all enjoyed our dinner. After dinner Sinbad entertained us with his computer knowledge. He knew all the frustrating things that we had to deal with when working with computers and the Internet. His imitation of a graphic loading in on a slow computer made all of us burst out laughing.

Later, Ron Howard, AKA Opie Taylor spoke to us about his computer knowl

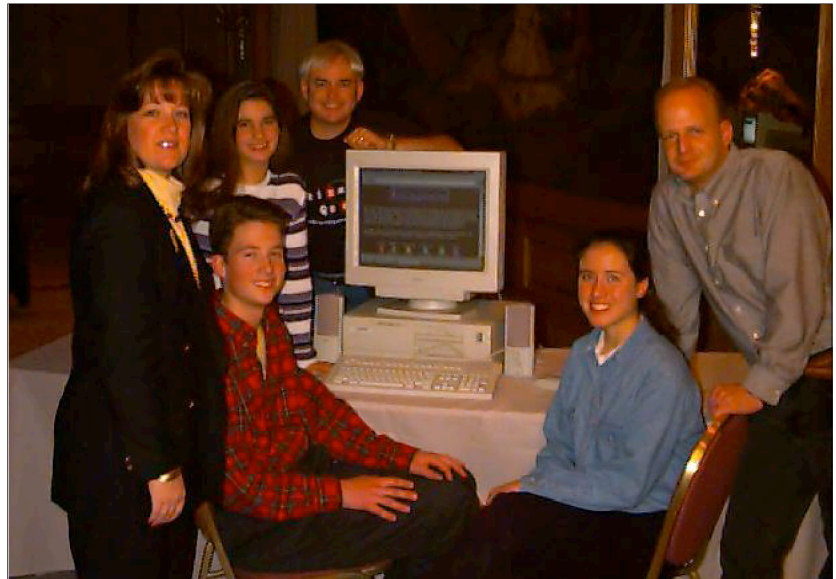
News from SEPA States  
continued

Kris McCall  
Sudekum Planetarium  
Nashville, TN  
and  
Lisa DuFur  
Craigmont Planetarium  
Memphis, TN 38128

Kris McCall  
Sudekum Planetarium  
Nashville, TN  
and  
Lisa DuFur  
Craigmont Planetarium  
Memphis, TN 38128

Top: standing, left to right: Lisa DuFur, Riki Haley, and Duncan Teague (Memphis, TN), and Geoff Holt (Madison, WI); sitting, left to right, Andrew Holbrook (Madison, WI) and Stephanie Lim (Memphis, TN).

Bottom: Actor and comedian Sinbad watches, listens, and asks questions as team members show off our site.



edge. He said computers scared him and admitted he should get more involved. He and his wife were a delight to meet and it was an honor to have them attend our Awards Ceremony.

Our team won fifth place in the nation which we thought was great knowing that there were more than one thousand entries to begin with, and we made it to the final cut of 34 teams. Each of our students was awarded \$3,000 in scholarship money, a plaque, and a trophy that weighed at least ten pounds. It was beautifully designed with a marble base and a large silver falcon on the top with each student's name engraved on her trophy. Oh yeah! Each coach received \$500



dollars for their personal use and \$500 for their school. That's not too shabby in my opinion!

Overall this was an absolutely overwhelming and truly positive learning experience. Our team is already excited about next year. We invite you to visit our page, The Online Planetarium Show, (TOPS) at <http://tqd.advanced.org/3461>.

Ethyl Universe Planetarium, Richmond

There always seems to be something going on at the Ethyl Universe Planetarium. According to Eric Mellenbrink and Ken Wilson there has been a recent reorganization of the planetarium staff. This has put Eric in charge of theater operations, special effects, and maintenance. While Ken becomes the new Director of Electronic Outreach and Astronomy. Planetarium shows will be produced by the

relatively new staff member Andrea Gianopoulos who operates out of the Multimedia Productions Department.

The museum is still working on park construction. This will be an ongoing project to improve signage and lighting. Ken says that it will improve the looks and security but will be at the expense of dark skies. ( They report that a couple of hundred people attended a special skywatch event for the lunar eclipse in September.

Dave Maness  
Peninsula Planetarium  
Newport News, VA



### Arlington Public Schools, Arlington

They are back into the schedule of school programming at the Arlington planetarium. Also showing is a public offering of Rusty Rocket's Last Blast. Show times are Fridays and Saturdays at 7:30 p.m. and Sundays at 1:30 and 3:00.

### Pitts. Co. Schools Planetarium, Chatham

Brian Buchanan reports his Goto Venus planetarium needs some work but is having great difficulty in finding parts, like slip rings, as Goto does not make those anymore. If you have any ideas to help him out, I'm sure he would appreciate it. His is mainly a school planetarium but groups of ten call to set up appointments for special topic programs. One of those upcoming is the Christmas Star on December 7th. He is talking with Astronomy clubs about the possibility of starting a club in his area. In addition, he has on order an ST7 system for CCD astronomy.

### Pretlow Planetarium, Norfolk

Bruce Hanna says the college has laid the foundation for a new observatory on top of one of the science buildings. This exciting project includes remote controlled CCD imaging. The scope will likely be a 10 Meade Schmidt Cassegrain scope.

The planetarium will host a meeting of the Chataqua Society. A major part of that meeting will be a crash course for educators in ways to incorporate observational astronomy into the classroom. The fee is \$40.00 to the National Science Foundation. Housing is on your own. For more information call Bruce Hanna at (757) 683 4108. He says Hi to Jon Bell.

As in many university planetariums, public programming is limited. Private groups are limited to 120 people for a fee of \$50.00. He says that they do about 50 of those per year.

### Hopkins Planetarium, Roanoke

Britt Rossie is excited about two new videos at the planetarium. Beyond the Lost Waterfall is a cave video produced locally which complimented their traveling exhibit Bats: Masters of the Night. Britt says that this production is their first commercial video release. The second one is Tutelo: Search for the Last Totera produced in house for the George Washington & Jefferson National Forest. This is a video documentary about the local Native Americans in Southwest Virginia.

Research and production for the program involved travel throughout Virginia, North Carolina, Pennsylvania, as well as Ontario Canada. These two new videos are being shown on the new Barco Projector system. Britt exclaimed, At last, we have video projection! He hopes that more theater improvements will follow before the 1998 SEPA Conference in Roanoke.

Upcoming in the winter will be the holiday show, Season of Light and the traditional star show Jewels of the Night.

### Peninsula Planetarium, Newport News

We have had a busy summer and the autumn is shaping up the same way. School programs are beginning to pick up in our planetarium and in the Hampton Schools planetarium which we also operate for part of each year. On September 26 we held a Total Luna See Party the night of the eclipse. This attracted well over 700 paying visitors. We had planetarium shows with lunar eclipse simulations, Star Trek costumed characters, Klingons, moon rock interpretation with lunar samples, meteors, tektites, face painting, games, a space suit, Dinamation Dinosaur exhibit, nocturnal animals, Moon music provided by local musicians John and Cindy Kays, and a chance to get your picture taken with a Federation Starfleet character. Fortunately, the weather cooperated for the second time in one year and we observed the entire eclipse with our own telescopes and others brought by the local Tidewater Astronomical Society. A fun time was had by all. We also set up a homepage for the eclipse and provided nearly live images of the moon updated every few minutes. One email message came to us from New Zealand thanking us for making it possible for them to view the eclipse from down under. I and my assistant plan to give a talk about how to do this at the next SEPA conference.

After a long run of The Great Dino Caper: a Mesozoic Murder Mystery we are excited to offer Comets are Coming from the Adler planetarium for the fall season. Laser shows will return with AVI's Laser Holidays for the Christmas season and rock and roll shows in the winter and spring. Along with that, Star of Wonder a local tradition for over 30 years (updated, of course) will run through the Holidays.

Our new homepage is running now: at <<http://users.visi.net/~stargazr>>.

News from SEPA States  
continued

Dave Maness  
Peninsula Planetarium  
Newport News, VA

is a statement of probability applied to a very large number of particles. Remember, one mole of a substance contains  $6.023 \times 10^{23}$  particles. Under standard conditions (one atmosphere of pressure and 298 K), one mole of a gas occupies 22.4 liters of volume, just a bit bigger than the volume occupied by a basketball. Within that basketball sized volume is a large number of particles, each of which is moving at a specific velocity. The mean of those velocities is the RMS velocity but some will be travelling much faster than this; this is the basis for our assumption that if the RMS velocity is equal to or greater than 20% the escape velocity, then the gas will escape from the atmosphere.

Atmospheres are not merely those annoyances that hinder the view of surface features on Mars or make our seeing bad on those nights that we wish to observe. We tend to view atmospheres as annoyances or as something separate from the planet; this view is incorrect. Atmospheres are intimately related to the planets; they were outgassed from the interiors in some cases and in others, they are the planet.

Every time that you look at a planet you are looking at four and a half billion years of complicated interplay between two very simple forces that are acting on the gases that make up the atmosphere. Think about that the next time you look at Jupiter or

Mars through the eyepiece of a telescope.

Planetary atmospheres are fascinating places. They reflect the tremendous changes that have occurred in the solar system since it formed. They give us a glimpse into some of the fundamental processes that occur in the solar system outgassing, thermal evolution, formation of internal structure, chemical evolution. The chemical cycles that occur in them shed light on interrelationships between the surface, the atmosphere, and the Sun. Isotopes and inert gases hold clues to the evolutionary histories of planets if we can unlock the secrets they contain. The history of a planet is contained within its sphere of gases. Atmospheres provide necessary constraints to the models of the formation of the solar system.

We cannot hope to understand the solar system without first coming to terms with its atmospheres. They are as vital an understanding of the solar system as geology or nuclear physics. On the macroscopic scale, we see an atmosphere as the dominant feature on a planet like Jupiter or Saturn; on the microscopic scale, we see atmospheres as temporary features on objects like comets. There is a whole host of intermediate stages between the two but the same basic rules govern all of them.

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#### APPENDIX 1: Escape Velocities and Temperatures

Body	Escape Velocity (km/ sec)	Temperature (Kelvins)
Mercury	4.25	700
Venus	10.30	740
Earth	11.20	290
Moon	2.38	400
Mars	5.10	240
Jupiter	60.00	125
Io	2.56	115
Europa	2.01	110
Ganymede	2.74	110
Callisto	2.44	110
Saturn	36.00	95
Titan	2.60	82
Uranus	21.00	60
Neptune	24.00	60
Triton	1.46	55
Pluto	1.20	40

The listed escape velocities are for the surface of the planet in the case of terrestrial bodies, or the cloud tops in the case of the giant planets. The temperatures listed are the equilibrium temperatures. The temperature for Io is an average; near the volcanic vents the temperature is around 400 K.

## APPENDIX II: Temperature Variation in Earth's Atmosphere

Altitude Range (km)	Temperature ( K)	Name of Layer
0 10	274 250	Troposphere
10 20	250 220	Stratosphere
20 50	220 274	Stratosphere
50 80	274 195	Mesosphere
80 100	195 440	Thermosphere or
100 180	440 1000	Ionosphere
180 200	1000 1200	Thermosphere
200 300	1200 1225	Thermosphere
300 500	1225 1300	Thermosphere

Note that the temperature fluctuates at various layers. As we go higher into the troposphere, the temperature drops steadily until we reach an altitude of about 20 km where the temperature has fallen to 220 K. The temperature rises from there until we are at an altitude of about 45 km where the temperature is 273 K. The temperature drops from there until we reach an altitude of some 85 km where the temperature is 195 K. The temperature climbs steadily from this point with increasing altitude.

## APPENDIX III: Constituents of Planetary Atmospheres

### Venus:

Carbon dioxide (CO <sub>2</sub> )	Water
Carbon monoxide (CO)	Hydrogen chloride (HCl)
Hydrogen fluoride (HF)	Argon (Ar)
Krypton (Kr)	Hydrogen sulfide (H <sub>2</sub> S)
Carbonyl sulfide (COS)	Sulfur dioxide (SO <sub>2</sub> )
Hydrogen (H <sub>2</sub> )	Helium (He)
Sulfur trioxide (SO <sub>3</sub> )	Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> )
Oxygen (O <sub>2</sub> )	

### Earth:

Nitrogen (N <sub>2</sub> )	Argon
Carbon dioxide (CO <sub>2</sub> )	Neon (Ne)
Helium	Methane (CH <sub>4</sub> )
Krypton	Hydrogen
Nitrous oxide (N <sub>2</sub> O)	Carbon monoxide
Xenon (Xe)	Ozone (O <sub>3</sub> )
Water	Sulfuric dioxide (SO <sub>2</sub> )
Sulfuric trioxide (SO <sub>3</sub> )	Nitric oxide (NO)
Nitrogen dioxide (NO <sub>2</sub> )	

### Mars:

Carbon dioxide	Nitrogen
Argon	Oxygen
Carbon monoxide	Water
Neon	Krypton
Xenon	Ozone

### Jupiter:

Hydrogen	Helium
Methane	Ammonia
Ethane (C <sub>2</sub> H <sub>6</sub> )	Acetylene (C <sub>2</sub> H <sub>2</sub> )
Water	Methyl acetylene (C <sub>2</sub> HCH <sub>3</sub> )
Carbon monoxide	Germanium tetrahydride (GeH <sub>4</sub> )
Hydrogen sulfide	Ammonium sulfide (NH <sub>3</sub> HS)
Phosphine (PH <sub>3</sub> )	

APPENDIX III: Constituents of Planetary Atmospheres (continued)

Io:	
Sulfur dioxide	Sodium (Na)
Saturn:	
Hydrogen	Helium
Methane	Ammonia
Phosphine	Ethane
Acetylene	Methyl acetylene
Propane (C <sub>3</sub> H <sub>8</sub> )	
Titan:	
Nitrogen	Helium
Methane	Ethane
Acetylene	Propane
Diacetylene (C <sub>4</sub> H <sub>4</sub> )	Methyl acetylene
Hydrogen cyanide (HCN)	Cyanoacetylene (HC <sub>3</sub> N)
Cyanogen	Carbon Dioxide
Carbon monoxide	Argon
Ethylene (C <sub>2</sub> H <sub>4</sub> )	
Uranus:	
Hydrogen	Methane
Helium	Water
Neptune:	
Hydrogen	Methane
Helium	Water
Triton:	
Nitrogen	Methane
Pluto: (when it has an atmosphere; see text)	
Methane	Nitrogen
Carbon dioxide	

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SOURCES AND REFERENCES:

- Bate, Roger R., and Donald E. Mueller, and Jerry E. White, *Fundamentals of Astrodynamics*, New York: Dover, 1971
- Brady, James E. and Gerard E. Humiston, *General Chemistry: Principles and Structure*, 4th ed., New York: John Wiley and Sons, 1986
- Chang, Raymond, *General Chemistry*, 5th ed., Highstown, New Jersey: McGraw Hill, 1994
- Consolmagno, Guy J. and Martha Schaeffer, *Worlds Apart: A Textbook on Planetary Sciences*, Englewood Cliffs, New Jersey, 1994
- Moore, Patrick, Garry Hunt, Iain Nicolson, and Peter Cattermole, *The Atlas of the Solar System*, New York: Crescent Books, 1990
- Schaeffer, Vincent J. and John A. Day, *A Field Guide to the Atmosphere*, Boston: Houghton Mifflin Company, 1981
- Zeilik, Michael, *Astronomy: The Evolving Universe*, 7th ed., New York: John Wiley

# *Southern Skies*

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1997 dues are now due.

See the membership renewal form on page 3.

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### Officers

President  
Kristine K. McCall  
Sudekum Planetarium  
800 Fort Negley Boulevard  
Nashville, TN 37203  
Voice: (615) 401-5077  
Switchboard: (615) 862-5160  
Fax: (615) 862-5178  
Email: mccalk@ten-nash.tenk12.tn.us

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

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

Past-President  
Richard McColman  
Morehead Planetarium  
Morehead Building CB #3480  
Chapel Hill, NC 27599  
Voice: (919) 962-1237  
Email: Voyager222@aol.com

IPS Council Representative  
John Hare  
3602 23rd Avenue West  
Bradenton, FL 34205  
Voice: (941) 746-3522  
Fax: (941) 750-9497  
Email: jlhare@aol.com

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

### Associate Editors

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

Digital Cosmos/Graphics  
Mike Cutrera  
Bishop Planetarium  
201 10th St. West  
Bradenton, FL 34205  
Voice: (941) 746-3522  
Fax: (941) 746-2556  
Email: Zoot11@aol.com

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

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

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

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

# NEWS RELEASE

(Revised)

## GLPA Planetarium Show Kit Solar System Adventure Tour

The Great Lakes Planetarium Association (GLPA) has just released its first planetarium show kit. This participatory program, designed for grades 3 - 6, is available to GLPA members for cost (actually less than cost). Students climb aboard the Star Traveler as the planetarium becomes the interior of a spaceship, and they become the ship's passengers. Views of the Sun and each of the planets appear out of the ship's portholes. Information cards held by each of the students are entered into an imaginary computer causing a visual display of planetary statistics to be displayed on the dome. This package was designed with minimal equipment requirements.

This production was made possible through the generous efforts of many talented people. The show was written by Dave DeRemer (Charles Horwitz Planetarium, Waukesha, Wisconsin), includes an all original music score by Jeff Bowen and a digital soundtrack by Bowen Productions, and features original artwork by Ray Strong.

The show package includes a soundtrack available on either DAT or cassette audio tape, a script, a slide list, 115 color and kodalith slides, production notes, and sample audience information cards.

The price until October 31, 1996 was \$75.00. Purchase orders from institutions were accepted. Show packages were available for shipping late last summer.

For GLPA members wishing to order Solar System Adventure Tour send your check (payable to GLPA) or purchase order to: Mitch Luman, Koch Science Center & Planetarium, Evansville Museum of Arts & Science, 411 S.E. Riverside Drive, Evansville, IN 47713, or call Mitch at (812) 425-2406. If you have questions, contact Dave DeRemer at (414) 521-8841. Individuals wanting membership information should contact Gene Zajac, Shaker Heights Planetarium, 15911 Aldersyde Drive, Shaker Heights OH 44120 (216) 295-4251.



# In Memoriam



George Brown, Jr.

1956      1996

