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Please notify the Editor of changes of IPS officers and affiliate representatives.
Letters

Closure of McLaughlin Planetarium

Dear Editor:

Although many members of IPS may have heard the news of the closure of the McLaughlin Planetarium, I hope that this note will serve to confirm and to clarify what has occurred.

On October 26, 1995 the Board of Trustees of the Royal Ontario Museum approved the recommendation of Senior Management of the museum and announced to staff and public that the McLaughlin Planetarium was to be closed in response to a mid-year cut of 3% in the museum's $20,000,000 operating grant from the Province of Ontario. As a consequence the last public and laser shows were presented on November 5 and the last school programs on December 15. The star theatre and astronomy gallery have been "mothballed" and all a/v equipment removed for safe-keeping.

All staff save three were given termination notices. Ian McGregor, our educator, has been transferred to the museum Education Programs to develop and present astronomy and science programs for the museum. Our computer graphics producer was retained by Digital Media Services to work on museum projects. I am remaining, at least temporarily, to oversee the shutdown and possibly longer to work on plans for a renewed facility. Although the planetarium closure was the most dramatic and public action there were also layoffs in other areas of the museum.

The closure scenario was developed without substantive consultation. When I became aware of it less than two weeks prior to the Board decision alternatives were proposed to operate a significantly reduced costs but rejected. In its initial public statements the museum offered as a rationale that the closure was a strategic decision to deal with the current and anticipated cuts in operating grants, that the planetarium attendance had been in decline because planetariums were creatures of the space exploration fever of the late 60's and astronomy was no longer part of the school curriculum, and that there was already a plan to close in a few years to redevelop the facility into an attraction with significant revenue generating capability.

The facts were that attendance had been fairly stable in the 90's and the summer star show attendance was the best since 1988 with the upward trend continuing into the fall. School visit attendance and bookings were up 10% against the same period. Astronomy and science educators trashed the position offered by the museum. A column by Terry Dickinson was particularly effective.

Letters of support came from many quarters including the officers of IPS. They were much appreciated by the planetarium staff.

The real reasons for the decision lie with the Board of the museum. The Royal Ontario Museum is Canada's largest museum with major collections in Art and Archaeology and Natural Science. Board members are not selected for their interest in astronomy or, for that matter, education. There was a plan to renew the McLaughlin Planetarium star theatre and it had been included in the museum's capital funding proposals for the next 5 to 10 years. In a perverse kind of logic the arguments for updating and renewing the theatre became arguments for closing despite the fact that with the exception of the Zeiss projector the theatre systems were as good or better than most facilities. It now seems clear that in the mind of some managers and board members a planetarium operated by a major museum should cost nothing. The cost effectiveness of the planetarium program delivery was many times better than the museums but that was not sufficient.

Despite the outrage over closure and support from the community, it is not likely that the decision will be reversed. Rather the museum has been forced to clarify its position and has now stated in effect that it does intend to have a renewed planetarium in conjunction with other revenue generating components and that the decision to close the facility earlier than the renewal process would have dictated ensured that other parts of the museum could stay open. Indeed the working group for planetarium renewal has already begun meeting. It also seems likely for a variety of reasons that the building itself will remain. Because of the expectation of renewal there will not be a wholesale disposal of assets at this time.

While there may be a renewed McLaughlin Planetarium in the future it is likely in any scenario several years off. In the meantime the staff, the people that are the heart and soul of every planetarium, are gone. They would want me to acknowledge for them how important they were to an international family of Planetarians. We know that the impact of this closure was felt deeply.

As a final thought, I urge those of you who depend on boards and managers in large institutions to be vigilant. The ethos of fiscal constraint is not unique to this jurisdiction and what was done here may become a rationale for similar action elsewhere.

Tom Clarke, Head
McLaughlin Planetarium
Toronto, Ontario, Canada

From the Editor

Please welcome Lars Broman as the new Associate Editor for Regional Roundup. Please direct materials to him so that your colleagues around the world know of your activities. Lars replaces Steven Mitch who served the Society admirably by preparing 36 columns from 1987 through 1995. Thank you, Steven, for nine years of good work.

I've bowed to common usage and deleted the article "The" in this journal's title, which now is called simply the Planetarian.

With the thought that the IPS might one day establish a presence on the Internet's World Wide Web, I am beginning to collect the best articles from past issues of the Planetarian and store them digitally. My thought is that they form the core of a document archive that people access on-line. In the next issue I'll publish a short list of articles that are available for future use. Of course, I'll also distribute that list through the planetarium information services that Alan Gould describes in this issue. Until the IPS is ready to make use of these articles, I will distribute them by personal email on request.

Speaking of email, please note my new Internet address: jmosley@earthlink.net. Please use this address for all Planetarian electronic correspondence.

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Cosmic Disaster in 2000!

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Doom at the End of the Millennium

We will hear from all quarters—psychics, astrologers, pyramid experts, prophets of the apocalypse, and good old Nostradamus—in books, in videos, and on TV, that civilization—or the world itself—will end at the end of the millennium. Some will cite the planetary alignments in May 2000, and as astronomers we will be asked to explain, defend, and even reassure. The broadcast media has a strong sensationalist element and may do more harm than good; at the very least they will spread cries of doom quickly and widely. Recall the intensity of fears during previous similar scares when a lot of people were genuinely frightened. It will be an interesting few years. Like it or not, we will have to deal with the public and with the media at yet another end of the world at the end of the millennium.

The thought that the world will end at a massing of the five planets dates back to at least 300 B.C. Despite all we've learned about the mechanics of the solar system in the last 23 centuries, ancient superstitions remain in full health. This time a massing of the planets accompanies a change of millennium—a double whammy for those who believe that such coincidences are turning points in a Master Plan for Human Fate.

This time a massing of the planets accompanies a change of millennium—a double whammy ...

Prophecies of chaos, whether triggered by planets or not, will be part of the general silliness that accompanies the end of the century. For most people, it will be a milestone to be celebrated, not dreaded, and there should be some pretty good parties. Hillel Schwartz in Century's End documents the stories of past fins de siècles and comments at length on the coming century rollover. (Incidental-
apocalyptic doomsayers to clever entrepreneurs trying to make an honest buck. It has gone so far that a consulting firm has been established specifically to help others market the millennium. The broadcast media will not stand idly by as the craziness begins and they will be more than glad to fan the flames.

Mixed in with the joyful celebrations and silliness will be cries of impending doom and destruction. Ultimately we will hear everything from predictions by fundamentalists of the fulfillment of biblical prophecies to planetary tidal forces run amok.

Nostradamus

Our old 16th century friend Nostradamus will be in the forefront, and although his turn-of-the-millennium prediction does not refer specifically to planets, we will hear him quoted often enough to want to know what he had to say. His presence will be felt. And others will build on his prediction for 1999 and link it to planetary alignments (which Nostradamus surely did not know of and could not predict) the following year. Nostradamus was big news, especially in California, in 1988. Although the quatrain that we were told predicted an earthquake was a fabrication as presented in the popular press and it could be referenced to no identifiable year, the situation is quite different this time. The fact is that Nostradamus did predict big trouble for 1999.

By way of background, from 1550 to 1567 the French astrologer, physician, and mystic Michel de Nostredame published a series of 942 predictions in rhyme about future world events. (He also wrote a book or recipes for love potions and a preventative for the Black Death.) His followers credit him with predicting the European influenza epidemic of 1918-19, the 1956 Hungarian revolution, the assassination of Yitzhak Rabin, and an awesome list of other events. He had a fascination for the second half of the 20th century! He looked into the future by using a crystal ball, and he wrote his predictions in verse, obscuring them by using a bewilderment of anagrams, symbols, puns, Old French, and Latin. He also invented a number of words and place names. The cynical will suggest that if you write a thousand nonsense verses and wait a few centuries, inventive people will eventually find events to fit to some of them. Nostradamus himself said that the quatrains were unclear so that "they could not possibly be understood till they were interpreted after the event." How convenient. This is actually a good recommendation for avoiding embarrassment such as Hugh Allen's interpretation that the Germans would invade New York in 1942, among many others that went awry.

(If anyone has compiled a complete list of predictions credited to Nostradamus, especially for this century, I would like to know of it.)

Actually, Nostradamus wrote for a contemporary French audience and most of the places he mentions are in or near France. He referred frequently to noble French families, and although he specifically mentioned numerous obscure French towns and rivers, he ignored the New World. Most importantly, although he made up plenty of words, he did not use any such as “bombe atomique,” “Kennedy,” or “Los Angeles”—words that would have seemed strange and exotic, as well as completely meaningless, to his contemporary audience but that would con-
vence us he could indeed see the future. What is truly amazing is that these obscure verses from the age of superstition should be remembered today!

Quatrain 10-72 is the only dated quatrain with a date still in the future, and as such it is unique. This is the last opportunity for his followers to score a direct hit by stating explicitly what their master predicted and then reaping all the glory that comes with successfully predicting the future. (Here is another opportunity for someone to collect and catalog predictions for calibration purposes.)

According to the translation by Edgar Leoni in his monumental Nostradamus and His Prophecies, quatrain 10-72 reads:

L'an mil neuf cent nonante neuf sept mois,
Du ciel viendra grand Roy deffrayeur
Resusciter la grand Roy d'Angolmois.
Aunt apres Mars regner par bonheur.

The year 1999, seventh month,
From the sky will come a great King of Terror:
To bring back to life the great King of the Mongols,
Before and after Mars to reign by good luck.

(Angolmois can be interpreted as an anagram for Mongoloi; it could also refer to the French royal House of Angouleme. Or maybe it will only make sense after the fact.)

Today this widely quoted quatrain is variously thought to refer to a tyrant from Libya (guess who) or Persia, but not necessarily China or Mongolia. People will learn of the quatrain from many sources, including the film The Man Who Saw Tomorrow. This film, available on home video, dramatizes the ultimate Middle East act of terrorism as a blue-turbaned despot lets the missiles fly and mockingly initiates World War III. The film, which was produced in 1981, predicts a major earthquake in California in May, 1988, followed by world-wide natural disasters. These culminate with the beginning of World War III in or soon after 1994 (when “the sun, Mars, and Mercury are in conjunction in the sign of Aquarius”). The war becomes nuclear in 1999 when an Antichrist from the “Kingdom of Mohammed” invades the west. Fortunately, after 27 years, the good guys eventually win and a thousand years of peace follow. Sadly, the world ends in 3797 A.D. (Be sure to emphasize to people who see the video that events since 1988 have not unfolded exactly as predicted. Perhaps the video will be revised before being re-released. Or maybe it is too full of obvious error to be shown today.) However, even if the video were to disappear, people will learn of Nostradamus’ 1999 quatrain from an infinity of other sources. All Nostradamians know it, and they will tell us about it.

I propose that a data bank be established
When Does the Century End?

As keepers of the calendar, we will be asked (as we have been for years) to "settle the debate" on when the century will end. The correct answer is that, because there was no year zero, the 20th century and the second millennium both end on December 31, 2000, and not December 31, 1999. The first century, like all since, had 100 years; it began in the year 1 and ended at the conclusion of the year 100. The second century began with the year 101, and so on; the 21st century begins on January 1, 2001 and the present century ends at the conclusion of the year 2000.

However, this argument will have no weight for people to whom it is obvious that the change from 1999 to 2000 involves more digits. I am sympathetic with them. Schwartz describes in Century's End how, at the end of the last century, newspapers and sources of authority unanimously counted the new century from January 1, 1901, but virtually all actual celebrations were held on the last day of 1899. The people know better than the timekeepers when to party. We will see the same pattern this time, when the major celebrations will occur on New Year's Eve of 1999, despite being told this is "wrong."

I propose a simple compromise. Those of us who will party in 1999 are really celebrating the end of the nineteen-hundreds, a complete century which began on January 1, 1900 and which ends on December 31, 1999. The same date also marks the end of the unnamed millennium of four-digit years that begin with 1.

Whether you celebrate the end of the 1900s, the end of the 20th century, or the end of the second millennium, it certainly won't affect predictions of doom.

The quatrain describes events that occur in the year prior to May 2000, and its importance is that doomsayers at the end of the century will link Nostradamus' quatrain with the alignments that follow and blend them into a snowballing sequence of disasters that will rend the earth asunder. It will be up to us to unravel the threads.

The reference to Mars in the 1999 quatrain above does not refer to the planet's position; Mars is used as a symbol for war. The quatrain describes events that occur in the year prior to May 2000, and its importance is that doomsayers at the end of the century will link Nostradamus' quatrain with the alignments that follow and blend them into a snowballing sequence of disasters that will rend the earth asunder. It will be up to us to unravel the threads.

What will concern us astronomers even more as the digits roll over are predictions of doom based on the positions of the planets.

5/5/2000

Most members of the public will get their information on planetary alignments not from desktop computer sky simulation programs, but from sensationalist books and films. The most famous planetary alignment of recent years was promoted in the notorious book The Jupiter Effect. The world survived this so-called alignment of 1982, but another book, called 5/5/2000 and subtitled Ice the Ultimate Disaster, by Richard Noone, is on the shelves. This book was originally titled simply Ice: the Ultimate Disaster, but was reissued with "5/5/2000" added to the title and jacket blur. Although the book is an unorganized mish-mash compared to the ostensibly authoritative The Jupiter Effect, it does make dramatic predictions that some people will find scary. Like Gribbin and Plagemann, Noone too suggests a chain of events culminating in catastrophe.

Noone's chain is extraordinarily shy on details about precisely how things will happen, but the gist is that Mercury, Venus, Mars, Jupiter, and Saturn will align with the earth for the first time in 6,000 years, and that will cause the ice that has been building up at the South Pole to upset the earth's axis, initiating sudden and catastrophic floods and earthquakes. The ancient Egyptians warned us about this 6,000 years ago (it happened to them, too; that's why they built the Great Pyramid), and Nostradamus simply confirmed the warning.

I found six instances in his book where Noone mentions the alignments of May, 2000: on pages 53, 129, 207, 213, 279, and 331 (but there could be more because, like most books of the genre, there is no index). Noone even never hints at how the planetary alignments will cause the earth to self-destruct, and this arm-waving contrasts dramatically with the vector calculus he quotes at depth to quantize the Great Pyramid's shape. He is, however, certain that the interval is exactly 6,000 years, no more and no less. To Noone, the alignment will be exact, too; he says "for the first time in 6,000 years all the planets of our solar system will be arrayed in practically a straight line in space" (p.53).

I've not been able to make much sense of his book or to discover its organization, if any. Most of it, however, is devoted to the "dreaded date embodied in the Great Pyramid's mathematical symbolism" (p. 213), but it ties together otherwise unrelated topics as the Book of Mormon, dinosaurs that lived contemporaneously with humans, Inca fortresses, the lost continent of Mu, the Ark of the Covenant, Velikovsky, Atlantis, and so on ad infinitum. All of his arguments are derivative. The assertion that too much ice at the South Pole will cause the earth to tip over dates to Charles Hapgood who elaborated on earlier ideas that too much ice at a pole would unbalance the earth.

The alignments seem to be a definite afterthought in a book that is really about secrets of the Ancients. The alignments give the book its title and dramatic cover illustration and they provide a date in the alarmingly near future to focus on, but they are entirely incidental to the book. The book devotes a total of less than half a page out of more than 300 to the planets in the year 2000.

Incidentally, recent studies indicate that the Antarctic ice sheet is among "the most stable geologic features on the planet" and unlikely to change suddenly ("Preservation of Miocene glacier ice in East Antarctica," Nature, pp. 412-4, Aug. 3 1995). Its present trend is to contract at 1.4% per decade ("Polar meltdown fulfills worst predictions," New Scientist, p. 4, August 12, 1995).

Noone's arguments and his thick book
same time there was an eclipse of the sun! Robert S. Richardson, astronomer at Griffith Observatory, describes in the May 1962 issue of the Griffith Observer what happened in Los Angeles:

Weeks beforehand we began getting inquiries from people wanting to know, “What was going to happen on February 4th?” “What does it mean?” was the next question. Then they wanted to know, “When was the last time it happened?” … This was one of those things an astronomer was supposed to have at his finger tips. … Answering questions of this kind for hours can become quite a strain on the nervous system …

Sunday, February 4 … [the crowd at the Observatory] must have been the largest since it was opened to the public in 1935. By two o’clock … the road leading to and from the observatory was a solid mass of cars lined up bumper-to-bumper for half a mile. …

Another woman was weeping so badly it was hard to understand her. She was practically on the verge of collapse. “I know it’s silly to carry on this way,” she gasped between sobs, “but I can’t help myself.” … In talking to these ‘Alarmed’ individuals, one gets the impression very strongly of an insecure personality, torn this way and that by vague doubts and fears. When confronted by a problem, they seem incapable of forming an independent opinion concerning it, but tend to rely on the judgment of others. They are so highly susceptible to suggestion that it would be very easy for anyone who has gained their confidence to take advantage of them. The barest hint that there might be something wrong could drive them to suicide or hysterics.

There was similar craziness around the world, especially in India.

1982: The Jupiter Effect

The last time the planets were supposed to align and trigger mass destruction in Los Angeles was in 1982, the year of the “Jupiter Effect.” According to the tabloid Midnight, “Astronomers and scientists are desperately worried that one of the most terrible disasters in the history of mankind may hit the United States … killing untold millions and reducing the American West Coast to rubble …” The public was told that “all the planets in our solar system will be in line” and the earth “will pass daily through the energy fields.” …

I was not “desperately worried,” but I was alerted.

The planets were not to work their magic directly on the earth, and as seen from earth there was no alignment. It was a heliocentric alignment. At their closest, on March 10, 1982, as seen from the sun, the planets spanned 95”, which is more than a quarter of the sky. As seen from the earth the naked-eye planets were spread across 130” of the sky. The Jupiter Effect was subtle. In a circuitous sequence of events, we were told that a rare heliocentric alignment of planets that occurs only once every 179 years exerts a strong tidal effect on the sun, which increases solar activity, which causes more sunspots, which propel more atomic particles towards earth, which disturb the normal circulation of earth’s atmosphere, which causes sudden major storms, which cause abrupt changes in the earth’s rotation, which triggers a major quake along faults (specifically the San Andreas) already subject to strain. No chain is stronger than its weakest link, and this chain had some links that were very weak indeed.

A salient feature of the Jupiter Effect was that it was promoted by scientists, and this gave it extra validity. A local feature for those of us who live in California is that the specific fault that was supposed to fail was the San Andreas, a major fault that extends nearly the length of our state. The authors referred repeatedly to “the next great California earthquake,” and this was even the title of one chapter. My immediate predecessor at Griffith, Edward Upton, recognized early what was going on, and in the January 1975 issue of the Griffith Observer he wrote:
But *The Jupiter Effect* has not been written to appeal to the scientific mind. It is written for those who are more impressed by dramatic language than by precise reasoning ... it is truly a novelty to receive it from the hand of two scientists whose training and education, if not entirely wasted, should have taught them better. It is difficult, indeed, to resist the suspicion that they do know better and that *The Jupiter Effect* is a gigantic deception directed at the ever-present gullibles. ... On page after page we find repeated the warning that great earthquakes are going to occur in 1982 along the *San Andreas Fault*. Why this one-track emphasis on impending disaster in California, as if it were the only place on earth subject to major quakes? Why are there no similar predictions concerning Chile, Alaska, Japan, Indonesia, or a hundred other places? Could it be because in California, better than any other place on earth, one finds a fear of earthquakes combined with a proven market for sensational books?

Untold millions did not die in 1982, but a lot of people were scared. Despite the focus of the book, concern was not limited to California. The *San Diego Vista Press* reported on March 10, 1982:

“We’ve literally had people ask, ‘Should I sell my house and move away?’” said Kevin Atkins of Gates Planetarium in Denver, Colorado. ... The institute reported 130 phone calls in five hours Monday.... One small Christian sect in the Philippines is building a maze of padded cubicles and trying out padded suits in readiness for disasters their leader, Casiano Nasair, predicts.

And according to the *Silver City Daily Press*, New Mexico, of March 8, 1982:

Boston’s Charles Hayden Planetarium ... has been inundated with calls, according to assistant director Walter Webb. ... And at New York’s Hayden Planetarium, phone lines were so busy that secretary David Ross had no time to talk.

According to the book this planetary alignment was directed specifically to California and little mention was made of other places. Yet it made the national news. Predictions for catastrophes the end of the world in 2000 will be global in scope.

I learned how tightly foreseers of the future stick together as they clamor on their bandwagon once a prediction has caught the eyes of the media, regardless of how bogus the initial source may be.

### 1988: Nostradamus

The last great planet-causing earthquake flap came six years ago. We at Griffith Observatory learned about it when we received a rash of phone calls asking, "Can you tell me when the planets are going to line up and cause that big earthquake?" Puzzled, we asked the callers the source of their (mis)information? It came from a 1981 movie about Nostradamus, called *The Man Who Saw Tomorrow*, that had just been shown on cable TV. As far as I could tell, it was this so-so movie suitable only for late-night TV that brought Nostradamus into the popular eye and initiated concern and fear over the "alignment." It’s no surprise that the modern American public receives its information on many vital matters via day-time talk shows and late-night TV.

*This bodes poorly for May 2000; a prophecy of doom has a life of its own once it starts, and even a small flame can start a big fire.*

### The Man Who Saw Tomorrow

*The Man Who Saw Tomorrow* referred to an earthquake that was to have happened in California in 1988, but it also refers specifically to more dramatic events that are to happen at the end of the millennium and that are to affect the entire globe, as described earlier. The video will probably resurface again, even though many of the events dramatically predicted in it have decidedly not come to pass as predicted. I recommend purchasing a copy on video cassette for your own self-defense.

*The Man Who Saw Tomorrow* is a docudrama that warns that certain predictions of the future are not comforting. Narrated by Orson Welles, it tells the story of Nostradamus in a sympathetic way that cannot fail to convince someone who is not familiar with the subject that here was a man with supernatural powers who could indeed see the future and who wrote his quatrains to warn future generations of troubles to come. It is full of archival footage of horrors of the past (World War II atrocities, for example) and scenes of disaster lifted from old science fiction films. Because it appears to be a documentary, many who see it are genuinely alarmed.

Not surprisingly for a film produced by David Wolper, the movie is full of exaggerations and outright fabrications. In one example of the movie’s manipulation of facts, a dramatic scene which is presented as a true historical incident shows looters opening the grave of Nostradamus during the French Revolution. To their dread and amazement, the looters find a plaque on the body inscribed with the month and year they opened the grave! One looter mockingly recalls a curse upon whoever disturbs the prophet's bones—and is promptly shot dead by a stray bullet. Narrator Welles looks you in the eye and asks you to be the judge if this can only be coincidence. The reality is that the tomb of Nostradamus, like so many other...
Nostradamus in the News, 1988

Lest we think that few people will be overly excited as the millennium ends, let us recall the intensity of fears the last time something similar happened. In 1988 there was a bogus Nostradamus prediction but no planetary alignment and no end of the millennium.

Will you be prepared to deal with this in your community in four years?

Associated Press, April 24

Video cassettes of The Man Who Saw Tomorrow are causing ... hundreds of calls from nervous Californians to therapists and seismic officials.

"This has gone beyond fun speculation. People are close to panic," said Santa Clara County geologist Jim Berkland. "Some are even selling their homes and moving away.

Jittery residents also are keeping their doctor's lines busy.

"People are suffering from everything from mild panic attacks to acute anxiety of this," said Dr. Donald Dossey of the Phobia Institute in Westwood.

People magazine, April 25, 1988

Laura Des Jardins, director of the Southern California Astrology Network (SCAN) believes "the full moon on May 1 will be enormously powerful because of its conjunction with Pluto. It will have a tremendous gravitational pull." L.A. stargazer James Baker sees "two major cycles of astrological stress situations between April 23 and May 1. It's an accumulation of incredible tensions."

Those tensions haven't gone unnoticed by the city's most visible residents, some of whom plan to vanish during the tremor season. George Hamilton says, "I'm leaving on May 5 and I'm not coming back until July." Joan Collins, reportedly, has already left for London. ... Dudley Moore is also preparing.

Evening Outlook, Santa Monica, CA May 3 1988

The Red Cross has been busy fielding calls from frightened residents, said Peggy Brutsche, a specialist in earthquake preparedness there.

"We've had a number of calls from people clearly inquiring because of the Nostradamus thing," she said. "Some of the public seem to be genuinely frightened from what they've heard."

Hundreds of people, some of them frantic, have been dropping by the Red Cross' Santa Monica chapter for safety tips.

"It's unbelievable the way people are reacting," said Mark-Antonio Grant, director of disaster services.

"They've been coming in droves, picking up booklets, fliers, anything they can because they are afraid of May the 10th." One woman even planned to move out of the state. "She was petrified," he said.

Los Angeles Times, May 6

Travel agents, moving company workers, bottled-water suppliers, real estate agents and earthquake preparedness specialists say they're observing a small but significant minority of Southern Californians either getting out of the area or getting prepared to survive the Big One. ...

But even though the observatory's hot line has three lines devoted exclusively to playing the 3 1/2 minutes Nostradamus message, "They're jammed. Apparently, even at midnight it's hard to get through," says observatory program supervisor John Mosley.

Stand-up comic/weatherman Fritz Coleman, who's been spotlighting the hot-line number during his KNBC-TV weather reports this week, also found his station's phones "ringing off the hook" ... "A lot of people are taking this real seriously," says Coleman. ... "The thing that makes me mad is that we have satellites and all this technology and people would rather believe this guy with a beret from the 16th Century."

Los Angeles- and Downey-based psychologist Robert R. Butterworth, who last year began working with children affected by the Oct. 1 Whittier earthquake, has instituted his own earthquake hot line, (213) 923-8011, offering instructions on decreasing prediction-related anxieties. But it's turned from "a hot line to a jammed line," he says. He also suggests that people call the 24-hour crisis hot line, (800) 262-1414, at Charter Hospital of Long Beach, where he will also be giving free Saturday and Wednesday evening seminars on calming earthquake fears.

"By my own informal survey, I'd be willing to say one out of 20 people are worried about earthquake predictions," Butterworth says. "Everybody seems to know at least one person who's really concerned."

"We had some inquiries in April from people asking if they could be moved at the end of the month," says office manager Linda Chavez of Western Mayflower Company in Montebello. "They indicated they wanted to move because they feared the coming quake."

It's not just fearful clients that Chavez has had to accommodate, however. There were enough worried employees in her office that the firm sought outside help. ...

"We've had the Montebello Fire Department explain to them the steps to take to be disaster prepared."

"We sold our house, which I thought was not structurally sound, because of a possible quake but the deal doesn't close until June," laments a Brentwood mother who has stocked bottled water, canned goods, first-aid equipment and other emergency supplies.

Earthquake jitters are translating into sales for companies specializing in bottled water and other disaster rations. Extend-A-Life, a Pasadena firm that calls itself "the largest purveyor of disaster supplies in America," claims that the Nostradamus prediction has triggered a 10-fold increase in sales this week of such products as pouches of purified water, 1,200-calorie survival cookie bars, first-aid kits, thermal blankets and AM-FM radios that derive their power from "hand-cranking."

"Since Monday, the calls have become almost hysterical," says chairman and co-founder Roberta Goldfeder. "A gentleman called from Beverly Hills who said that most of the people on his street were going to Florida and he didn't know what to do."

Robert Burke, marketing manager for Sparkletts...
drinking water, reports that sales of six-packs of one-gallon containers of water designed to be stored for earthquakes increased 500% during April.


"We have people taking amphetamines to stay awake so that when the quake hits they will be at their best," said Robert R. Butterworth, a psychologist who has been taking calls from people who are anxiety-ridden because of the predictions.

"There is one man who is building a stainless steel top on his bed to protect him from the earthquake. It is the only way he can sleep soundly," Butterworth said.

"The point is a lot of people are suffering, and they can't talk about this one problem because other people make fun of them," Butterworth said.


"The phones are ringing pretty steadily," said Brenda Searcy, a nurse who was answering crisis line phones at Charter Hospital in Long Beach Friday night.

"They're really panicking. Some of them are shaky and crying," Ms. Searcy said. "I've had a lot of parents call and say their children can't sleep at night because of the predictions."

Butterworth has told some who were so distraught as to be inconsolable to simply leave town for the month of May.

The Long Beach Red Cross chapter has been receiving 50 calls a day for the last 10 days, says spokesman Stan Schwartz.

Nevertheless, hundreds who fear the prediction swamped phone lines at Griffith Observatory, the American Red Cross and the California Institute of Technology.

"Most of these people aren't kooks. They're genuinely frightened, telling me they can't sleep, they're having nightmares and they don't know what to do," said Caltech spokesman Robert Finn.

Herald Examiner, Los Angeles May 9

"We have people taking amphetamines to stay awake so that when the quake hits they will be at their best," said Robert R. Butterworth, a psychologist who has been taking calls from people who are anxiety-ridden because of the predictions.

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"The point is a lot of people are suffering, and they can't talk about this one problem because other people make fun of them," Butterworth said.

Associated Press, June 1

The nation's second-largest city survived May without being destroyed by a disastrous earthquake, contrary to dire predictions by astrologers and followers of the 16th-century French seer Nostradamus. ...

"We've gone through the month of May with extraordinary unfounded predictions of a catastrophic earthquake in Los Angeles, and to me, this is like yelling fire in a crowded theater. Those who scared people should be ashamed of themselves," said Griffith Observatory director Edwin Krupp.

"There were many different people predicting every date of the month before we were done," Krupp said Tuesday.

letter-to-the-editor, Los Angeles Daily News, June 7 and Los Angeles Times, June 16

The month of May 1988 passed without a catastrophic earthquake in Los Angeles or elsewhere in California. I believe the self-appointed psychics, prophets and seers who predicted an earthquake would occur then should be held accountable for their irresponsible and unfounded comments.

Here at Griffith Observatory, since last fall, we have been uncomfortably aware that such prognostications are no harmless parlor game. We receive thousands of telephone inquiries and hundreds of letters from the public, who were understandably upset and often terrified by these predictions.

On May 5, 1988, after "Eye on L.A." telecast an entirely erroneous report about planetary alignment and an impending Southern California earthquake, hundreds of genuinely panicked people called the Observatory for verification and advice.

Even if we judge that adults are, in general, responsible for reaching their own conclusions about baseless predictions of earthquakes, young children who are exposed to the issue through television and other sources are not in a position to evaluate the validity of these claims. I have received numerous reports about the heightened anxiety of entire classrooms of young children because of the recent earthquake scare.

Those who predicted an earthquake in Los Angeles for May, claiming astrological or psychic sources of information, caused real emotional disruption and damage to the lives of thousands, perhaps hundreds of thousands, of individuals. To me, their statements are the equivalent of crying "Fire!" in a crowded theater and a dreary misuse of the right of free speech.

—E. C. Krupp, Director, Griffith Observatory

Herald Examiner, Los Angeles, June 1

A San Francisco scientist offered his own prediction: more cosmic disaster scares.

"For this rather large and lucrative New Age business to keep churning out sales, they need something cosmic every year or so. I suspect there will be further cosmic events," said Andy Fraknoi, executive officer of the Astronomical Society of the Pacific.
May 2000; a prophecy of doom has a life of its own once it starts, and even a small flame can start a big fire.

A curious aspect of the 1988 flap was that the movie did not claim that the planets would align. The quake would happen when the planets would be in specific, but very ambiguous, positions ("Mars in zero"). There was no question of tidal or other unknown forces acting on the earth; it was pure astrology. Yet the impact was strong, and the news media ate it up. If all this could come from a bad video that didn't even quote Nostradamus correctly and at a time when there were no planetary alignments, I shudder in fear of what will happen at the turn of the century/millennium.

In contrast to the Jupiter Effect and Nostradamus' 1988 prediction of doom, there were no planetary alignments, in May 2000 there is a nice series of alignments.

**Planetary Alignments in 2000**

In contrast to the Jupiter Effect and Nostradamus' 1988 prediction of doom, there were no planetary alignments, in May 2000 there is a nice series of alignments. They were first pointed out by Jean Meeus in 1961 and they figure into Charles Berlitz' forgettable book *Doomsday 1999 A.D.*, published in 1981. Astrologers and other doomsayers know of these alignments, which are already common knowledge among people who keep track of such things. There is even a discussion board in the Astronomy section of America Online devoted just to this topic. With sky simulation programs on everyone's personal computer, the cat is out of the bag.

Here is a narrative description of what will happen astronomically in 2000.

The year begins with the planets dispersed over 160° of sky and all but Mercury visible. Venus is prominent in the morning sky while Mars, Jupiter and Saturn are in the evening sky. Mercury moves to the evening sky and becomes visible early in February. All planets are then moving eastward

April 6, 2000, 7 p.m. standard time. The three planets Mars, Jupiter, and Saturn, plus the thin crescent moon are visible during evening twilight from mid-latitudes. Alt-azimuth grid squares are 5° apart. "Jupiter" overlaps the icon for Mars.
May 5, 2000. The five classical planets plus the sun and moon span 26°, their closest separation since 1962 and their closest until 2675. Only Venus in the morning and Mars and the crescent moon in the evening might be visible. Ecliptic grid squares are 5° apart.

May 5, 2000, as seen from the sun. The five naked-eye planets span 50°. The earth is in the opposite direction. Note that Jupiter and Saturn are nearly aligned. Ecliptic grid squares are 5° apart. These diagrams were created with Voyager II for the Macintosh.

May 17, 2000. From left to right (east to west), Mars, Mercury, the sun, Saturn, and Venus and Jupiter (which are in very close conjunction) span a geocentric arc of 19.5°. The moon is one day before full and in alignment by being nearly opposite the sun. Ecliptic grid squares are 5° apart. The symbols and names for Venus and Jupiter overlap. All diagrams this page created with Voyager II.
be visible, although not simultaneously, to people with binoculars and clear eastern and western horizons.

On April 28 at 14:56 UT Mercury passes 0.3° from Venus, but the two are less than 12° from the sun. The five planets and sun now span 30°.

The moon joins the five planets a few days later, and it remains between Venus, which is the westernmost planet, and Mars, which is the easternmost, from 9:37 UT on May 3 until 8:08 UT on May 5 as measured in ecliptic longitude and as determined by Meeus on May 17, determines the smallest geocentric spread in longitude of the five classical planets (and the sun, but not the moon), which span 19° 25'. The moon is in a kind of alignment by being 170° opposite the sun and 21 hours before full. This is a second instant for astrologers and psychics to focus on. All planets are too close to the sun to be seen—but we can demonstrate what is happening in our planetarium theater! After this moment, Jupiter's slower eastward motion causes it to lag behind the others and the planets begin to spread out.

Every astrologer and psychic will put his own spin on these alignments. They occur over so a wide a span of time that there should be opportunities to link at least a few natural and political disasters to planetary positions.

A notable feature of the May 17 minimum span is that Venus and Jupiter are separated by only 42 arcseconds! Venus almost occults Jupiter. It would be a wonderful sight were they not less than 7° from the sun. This close conjunction has already been compared to the 2 B.C. conjunction of the same planets that is often identified as the star of the Magi in the book of Matthew.

Conjunctions continue as Mercury passes Mars with a minimum true angular separation of 1°1 at 9:04 on May 19 (as determined by Voyager II). They are 12° from the sun and

May 5, 2000, as seen from a vantage point high above the sun, the planets do indeed look aligned. From bottom to top they are the earth, sun, Mercury, Venus, Mars, Jupiter, Saturn. The moon, not shown, is near new phase and is also aligned.

Mars passes Jupiter (they are 10° apart at 624 UT) with Saturn 6° to the east. This conjunction happens while Mars and Jupiter are 30° from the sun and it is easily visible. The prettiest evening sight of the suite of planetary groupings comes at about 7 p.m. local time on Saturday night, April 6, for middle latitudes in the United States, when the thin crescent moon is near Saturn and the moon and four planets fit within a circle about 9° in diameter. Daylight Saving Time begins the following morning in the United States.

All seven classical solar system bodies span their smallest geocentric arc in ecliptic longitude—25° 53¢—at 8:08 UT on May 5, as determined by Meeus. This moment is the focus of the book 5/5/2000 and is the culmination of the celestial massings. The sun is near the center of the massing, so all that will be visible will be Mars and the crescent moon, both 16° east of the sun in the evening sky, and perhaps Venus, 10° west of the sun in the morning sky.

This is as seen from the earth. As seen from the sun, the five planets, which in order

...
possibly visible. Jupiter passes 1.1° from Saturn at 13:20 on May 27. Venus is in superior conjunction with the sun on June 11 (and literally behind it), by which time both Jupiter and Saturn have become visible in the morning sky, where they rise 2° apart. Venus passes 0.2° from Mars at 17:04 on June 21 (both are far too close to the sun to see).

Another interesting massing (and a last chance for astrologers whose earlier predictions were not fulfilled) comes on July 1 and 2 when, for 11 hours, the moon, sun, Mercury, Venus, and Mars fit within a circle 8° in diameter. The massing will not be visible, of course.

By this time I think (and hope) that everyone will have lost interest in yet more conjunctions. Mercifully, Uranus, Neptune, and Pluto are elsewhere.

Every astrologer and psychic will put his own spin on these alignments. They occur over so wide a span of time that there should be opportunities to link at least a few natural and political disasters to planetary positions.

How Often Do the Planets Align?

Inevitably when discussing a planetary alignment, someone asks, “How often does this happen?” or “When will it happen again?”

It is hard to give a short and satisfying answer if more than two objects are involved. Of course, no series of alignments repeats exactly, but simply saying that way is interpreted as avoiding answering the question. You’ll be seen as obstructionist. People have the instinctive feeling that even if a particular alignment doesn’t repeat exactly, it repeats in a general way and there must be a way of putting a number to its rarity. This is certainly true of eclipses (the most unlikely event to occur).

The short answer to the question, “when was the last time the five planets plus sun and moon were this close,” is “1962, when there was a solar eclipse to boot—and nothing happened.”

<table>
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<th>event</th>
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<td>19.5°</td>
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<td>last</td>
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<td>15.8°</td>
<td></td>
</tr>
<tr>
<td>present</td>
<td>May 5, 2000</td>
<td>25.9°</td>
<td></td>
</tr>
<tr>
<td>next</td>
<td>March 20, 2675</td>
<td>22.6°</td>
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</table>

Other Alignments

The two main groupings of multiple objects that will draw the greatest attention are the minimum separation of all seven classical solar system bodies on May 5 and the even smaller minimum separation of five planets plus the moon on May 17. However, within this time frame there are other alignments that involve fewer objects but that are also interesting both astronomically and astrologically. From past experience we know that astrologers feel free to attach significance to whatever dates are available. In 1988 so many alternative dates were proposed that, by the time May rolled around, someone had picked almost every day of the month for the earthquake. And as I write this, Mercury is in conjunction with Uranus, an alignment a local astrologer finds quite important. Astrologers, psychics, and doomsayers of all persuasions will seize on the minor events of 2000 too.

The Venus-Jupiter conjunction on May 17 at 10:30 UT is extremely close. The planets’ centers are separated 42 arcseconds, or about 0.01 degree. Both planets are full phase with apparent polar diameters of 9.8 and 30.8 arcseconds respectively (as calculated by AstroVizier), and at closest their limbs are separated by only 22 arcseconds. It’s a shame they
won’t be visible!

I used 

Voyager II to search for close Venus-Jupiter conjunctions and then 

Starry Night and 

AstroVizier to examine the circumstances with greater precision. The last time Venus and Jupiter were closer than on May 17, 2000 (separated by less than 42 arcseconds) was at 3:47 on July 21, 1859, when their centers were 32 arcseconds apart (there was no partial occultation). The next time will be at 12:45 on November 22, 2065, when their centers will be 16 arcseconds apart and the northern edge of Venus passes in front of Jupiter. These values should be correct to a few minutes and a few arcseconds—adequate to answer the question.

Meeus pointed out in 1988 that some astrologers will focus on the almost simultaneous superior conjunctions of Jupiter and Saturn, which happen 64 hours apart. He pointed out that since the year 1600 there have been four occurrences (1623, 1742, 1881, and 1921) when the interval was less than 48 hours, resulting in an even closer matching. There were no major earthquakes nor were wars started on those dates.

Circumstances of conjunctions between the planets for the period 1990 to 2020 are listed in 

Part One of Astronomical Tables of the Sun, Moon and Planets by 

Meeus, second edition. (The first edition covers the period 1976-2005). This invaluable reference will tell you, for example, the dates of the last and next Mars-Saturn conjunctions before and after April 15.

Anticipate that you will be asked the "how often" questions, and have your answers ready in advance.

**Alignments Summary**

<table>
<thead>
<tr>
<th>Planets</th>
<th>Date UT</th>
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<tr>
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<td>Jupiter-Saturn</td>
<td>May 27</td>
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<tr>
<td>Venus-Mars</td>
<td>June 21</td>
<td>17:04</td>
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</table>

**Minimum Span in Longitude of Sun, Moon, and Five Planets**

May 5, 8:08 UT 25° 53'

**Minimum Span in Longitude of Five Planets (Plus Sun)**

May 17, 10:30 UT 19° 25'

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**Planetary Alignments and Earthquakes**

Many (most?) people believe that, when the planets align, they have an effect on the earth. People assume that somehow their gravity is focused and magnified, increasing their tidal forces and triggering an earthquake. To a person who doesn’t understand tides (or gravity, or science), it must be easy to imagine that this is so. During past alignments many callers simply wanted to know about the "planetary alignment that will cause an earthquake."

Usually the closeness of the alignment is overstated. In 1982, the year of the "Jupiter Effect," the tabloid 

Midnight reported that "all the planets in our solar system will be in line" and the earth "will pass daily through the energy fields." The covers of the books 

The Jupiter Effect and 5/5/2000 Ice the Ultimate Disaster both show the planets perfectly aligned. This is common imagery and is the public perception. It is useful to make the point that generally the alignment is not so dramatic (in 2000 it is pretty good), but regardless of how precisely the planets line up, we can still evaluate the idea that planets cause earthquakes. We can take two separate approaches.

First, it is supposedly gravitational tidal forces that trigger earthquakes. We can calculate the tidal force that each planet has on the earth, and this is shown below. The sun has 1 unit of tidal force on the earth; the moon has a little more than twice the effect of the sun; the other nine planets together have the planets perfect-alignment of the sun, moon, and planets.

<table>
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<td>Saturn</td>
<td>0.0000005</td>
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<tr>
<td>Uranus</td>
<td>0.000000001</td>
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<tr>
<td>Neptune</td>
<td>0.000000002</td>
</tr>
<tr>
<td>Pluto</td>
<td>0.000000001</td>
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The tidal force depends on distance and mass—but especially distance. A book you hold in your hands exerts a billion times as much tidal force as the planet Mars when Mars is at its closest.

Second, we can make lists of past earthquakes and of planetary alignments and compare them to see if there is a correlation. This is a very simple thing to do that requires no theory and almost no knowledge—just pads of paper and lots of time. There are 11,000 earthquakes each year in the Los Angeles area alone that are strong enough to be recorded, which is more than enough to do a proper statistical sample.

One study published in 

Nature 13 years ago (Kilston and Knopoff) claimed to find a weak correlation between large earthquakes on strike-slip faults in California and daily and semi-daily tidal stresses. That appears to have been the last word on the subject, however. From conversations with seismologists in the preparation of this article, it appears that the study has been either ignored or forgotten (or both). The feeling seems to be that a very weak correlation for a certain type of fault in a certain geographic area is not something to be excited about, and as far as I have been able to determine there is no interest in repeating the study.

However, the basis of the claims in 

The Jupiter Effect is that the tidal forces act on the sun, not on the earth, and that changes in the sun trigger seismic activity on the earth. This certainly didn’t work in 1982, and it probably hasn’t worked in the past.

In an attempt to correlate Chinese earthquakes with heliocentric planetary alignments since 1000 A.D. ("Chinese Records on the Correlation of Heliocentric Planetary Alignments and Earthquake Activities," W.-H. Ip, 

Iranus, 29, p. 435-6, 1976) Ip finds that, of the 11 earthquakes with an intensity greater than 8 since 1000 A.D., none coincide with a heliocentric planetary alignment. Ip concludes that "it appears that such an arrangement of planetary orbital positions has no effect on the triggering of earthquakes." Ip also summarizes a 1975 study by Yu Shen that has not been translated from Chinese into English. Shen attempted to find a correlation between 38 centuries of seismic activity in northern China and the 179-year heliocentric alignment of the planets much touted by Gribbin and Plagemann prior to 1982. Since 780 B.C., there have been 15 or 16 heliocentric alignments and 125 earthquakes in northern China with intensities greater than 6 on the Richter scale, but only one of these earthquakes (in 1624) coincided with a heliocentric alignment. Again the conclusion is that "heliocentric planetary alignments have nothing to do with the triggering of earthquakes, at least in Northern China."
if all we had to worry about was explaining the astronomy of planetary movements and the frequency of alignments, the millennium would end peacefully. I fear we will not get off so easily. We will quickly find that the hard part of our job is to counter the incredible predictions of cosmic doom that will come from all quarters, both print and broadcast. We will not escape, and if it or not we will find ourselves facing some pretty strange people.

Anyone can look for a correlation between tides and earthquakes and the first person to find such a correlation would be famous. Yet no one has yet found a convincing relationship—probably because there isn’t one.

Earthquakes are caused by motions within the earth. We would like to predict them for obvious reasons, but an appeal to the planets or to astrology won’t help.

If we are taking about gravitational and tidal forces of the planets, the situation is clear. Unfortunately, some members of our audience will dismiss the entire effort. In a posting to the “2000 Planets Align Discussion Board” of America Online (Dec. 14, 1994), “M” says: “What does ‘seeing’ the planets from earth have to do with it? What we will see is not the planets themselves, perhaps, but the intersection of the great Cosmic forces they represent.” Sigh.

**Mosley’s 10 Points for Dealing with the Media**

If all we had to worry about was explaining the astronomy of planetary movements and the frequency of alignments, the millennium would end peacefully. I fear we will not get off so easily. We will quickly find that the hard part of our job is to counter the incredible predictions of cosmic doom that will come from all quarters, both print and broadcast. We will not escape, and if it or not we will find ourselves facing some pretty strange people.

Many will be astrologers or psychics, and they and their dreary claims will be familiar from past encounters. The planetary alignments of 2000 are a variation on the general theme of cosmic forces affecting our destiny, and our arguments will be ones we’ve used before. It will be deja vu all over again. Like it or not, as ambassadors of astronomical knowledge we will be in the public eye—and often on a hot seat.

Here are suggestions from personal experience on how to deal with the news media and how to appear on radio and television talk shows, especially in a confrontational setting such as a debate with astrologers.

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**Know your facts. Do your homework. Rehearse what you will say.**

Do your homework prior to facing the camera.

Know how often the planets align (however you want to define an alignment) and when they did last and when they will again. Know (or have on a handy cue card) the dates of the several conjunctions in the series of alignments. Know what happened “the last time the planets aligned.” It’s hard to say “I’ll get back to you on that one” on camera. And “Oh, this kind of conjunction is very rare, very rare,” sounds as lame as it is.

Rehearse delivering concise answers to obvious questions like “Can you explain what is happening on May 5?”, “What effect do the planets have on the earth?”, “How often does this alignment occur?” and “How often do all the planets line up?” Recall that last time all seven bodies were this close was February 5, 1962, when nothing happened, and next time they will be this close again is March 20, 2675.

Prepare in advance any illustrations you plan to use.

**Anticipate the non-astronomical questions you will be asked and the arguments that will be used against you, and be ready with good responses.**

In addition to knowing the scientific facts of the situation, you will need to be able to discuss the non-astronomical aspects. The alignments in 2000 have little interest to astronomers and we would hardly think about them except that people will predict they will cause cosmic disasters. When we are called on to discuss these alignments, it will be in this context.

You may be challenged to explain why, when the moon has a tidal affect on the oceans and they are water, it cannot have a tidal affect on our bodies, which also are mostly water. Or you may be asked to com-
In addition to knowing the scientific facts of the situation, you will need to be able to discuss the non-astronomical aspects. … The rules are different in the world of pseudoscience, where targets shift constantly and where personal experiences have more weight than impersonal data.

ment on what Nostradamus supposedly said about this alignment. Or worse, what a local astrologer you have never heard of said yesterday. Our formal training does not prepare us well to talk about astrology or to debate people who have little training in and less regard for the way scientific matters are debated among scientists. The rules are different in the world of pseudoscience, where targets shift constantly and where personal experiences have more weight than impersonal data.

Know what local astrologers are predicting and what people will claim Nostradamus said. If you will be debating astrologers and psychics, you will need more ammunition than you got in your college astronomy classes.

Have practical answers to arguments that "the stars impel but don't compel," that "astrology is an inexact science, like medicine," that "we do not yet know all the forces in nature," that "Einstein and Galileo were laughed at (like me)," and that "scientists should have an open mind."

Read the articles referenced at the end of this article, and then lock yourself in a closet and rehearse. Practice answers for the questions you anticipate will be asked ("How often does this happen?") and get your replies down pat. You should not be thinking of an answer or explanation during the interview or debate; you should deliver the one you've practiced and use your mental energy to stay on top of the situation and to direct the conversation the way you want it going up to the subject with prefatory remarks only lessens your impact. Nor do you want to use so many unnecessary words that your point is obscured. Use simple and direct language and say what you want to say so that the meaning can be grasped without deep reflection. If you can be somewhat witty and clever at the same time, so much the better.

Don't, however, go overboard and come on so strong that you lose sympathy.

Avoid superfluous phrases such as "exhibits tendencies to", "has the ability to", and so on. Such useless verbiage is a barrier to effective communication. When you have only 20 seconds to summarize everything you want to say about something important, it is fatal.

Scientists have been taught to be precise and to qualify information. This is laudable, but if overdone it can get in the way of effective communication. It can also make you seem to be wishy-washy and unsure of yourself or your information, lessening your impact as an authority. Help your audience understand what you mean to say. Qualify sparingly and only where necessary.

The best defense is a good offense. Go into the situation with a list of points you want to make and be sure to get a few of them in. If you have a few points in mind as you begin, you can look for opportunities to insert them as opportunities permit. If opportunities do not permit, create them.

You should not be thinking of an answer or explanation during the interview or debate; you should deliver the one you've practiced and use your mental energy to stay on top of the situation and to direct the conversation the way you want it to go.

Practicing and rehearsing can be a lot of work and take a lot of time that we don't have, but if you find yourself facing an astrologer on national TV, as I have, you'll be awfully glad for the preparation. Consider the size of your audience.

Use direct and forceful language. Don't be ambiguous or qualify unnecessarily.

You won't have a lot of time, and warm-

Sometimes you can take a situation that is going nowhere and deflect it 90° to your own direction. Have you noticed how a politician, when asked a direct question, will often answer an altogether different question? We seldom want to avoid an embarrassing question by entirely dodging the issue, but neither are we obligated to allow ourselves to be trapped. I've been asked about historical connections between astronomy and astrology in a "when did you stop beating your wife" tone, and in such situations the best response can be to avoid being baited by redirecting the discussion. If facing a hostile interviewer or guest you might decide not to play by their rules; disregard the last comment or question and strike off in your own direction with a "Be that as it may, what I find really interesting..." and insert one of your agenda items. Take the high ground.

Most brief taped TV news interviews end with the reporter asking if you have anything you want to add. Don't let the oppor-

Work from your agenda. Have a mental list of the points you want to make and be sure to get some in. Take the high ground.

The best defense is a good offense. Go into the situation with a list of points you want to make and be sure to get a few of them in. If you have a few points in mind as you begin, you can look for opportunities to insert them as opportunities permit. If opportunities do not permit, create them.

You don't have a lot of time, and warm-
Most brief taped TV news interviews end with the reporter asking if you have anything you want to add. Don't let the opportunity slip by. Put your own spin on the story or state again something you didn't say right earlier. Be sure that you've said what you wanted to say, rather than just answer the questions they brought.

Use visuals. Bring small props. Use surprise.

TV is a visual medium. Even dumb props used to get a laugh can be effective on a talk show, and they can help you hold the high ground in a debate. I generally don't tell the host what I will do because he/she will react better if genuinely surprised too.

I wore a "No Nostradamus" button—a portrait of Nostradamus with a red circle around and a slash across in the international "No" style, created in a half-hour by our staff artist Neil Passey—when I appeared on the Today show, and it was the first thing that host Bryant Gumble asked about. It let me, rather than the astrologer who was the other guest, make the opening comments (which I had rehearsed). I wore it ever after when talking about Nostradamus, and I still have it for future use.

Abstract scientific concepts are wonderful, but if you can cast an argument as a short anecdote or story, it is more likely to be both grasped and remembered than if it remains abstract. Personal anecdotes work well.

Two trivial tricks I've used successfully are to pull a stick of chewing gum out of my pocket and claim that "astrology is like this stick of gum—it tastes good but it has no nutritional value." I've also pulled a tea bag out of my pocket and claimed that using the planets to predict the future is no different from reading tea leaves—it just sounds more scientific.

Simple pictures can also be effective. You could show a photograph of earthquake damage and ask why astrologers missed predicting this one. If you use the story of Gauquelin and Petiot as told below, for example, you could hold up a photograph of Petiot, who looks like someone's grandfather, or a typed copy of his horoscope so you can read it dramatically.

For the May 2000 planetary alignments, visuals showing where the planets are on certain days would be most helpful. Color is important. You might find useful slides from your collection, but be sure to use horizontal format slides only. I'm increasingly asked to bring video. I suggest that a possible activity of the IPS—perhaps of the Publication Committee—is to produce a short video showing where the planets will be during May 2000 for media use.) I have often set up a planetsphere program on my desktop computer to show the eclipse or alignment that is the subject of the story, and the news crew photographs the screen. The better commercial video cameras can now synch on a computer monitor without getting a rolling image.

Use anecdotes. Tell stories about people, and use drama and humor.

People relate best to stories about people. Abstract scientific concepts are wonderful, but if you can cast an argument as a short anecdote or story, it is more likely to be both grasped and remembered than if it remains abstract. Personal anecdotes work well.

When talking about UFOs I freely admit that I once saw one. While driving up the California coast as a tourist early one evening many years ago—before I was an experienced planetarium astronomer—I spotted a slowly moving light in the sky that was so bright I pulled off the highway to watch it. Others did the same. I was completely puzzled by this unidentified flying object until another watcher explained that it was the second stage separating from the first stage of a rocket launch over the Pacific. Now that I live in California I see such launches now and then, but at that time, never having seen such a sight, I was stumped to explain it. Once it was explained it went from being a UFO to an (identified)FO. We all see things from time to time that are outside our normal experiences and that we cannot explain without help, and I am sympathetic to other people who also see things they cannot explain, having had that experience myself. (This story takes 20-30 seconds to tell.)

When discussing astrology, and when time permits, I like to tell the story (in Dreams and Illusions of Astrology, Michel Gauquelin, Prometheus, NY, 1979) of the French psychologist Michel Gauquelin, who sent "his own" birthdate to a French astrologer and asked him to prepare a horoscope. It said (and you might pull out and flourish a sheet with "I have it here"), "He is a Virgo, instinctive warmth is allied with intellect and wit. ... He is endowed with a moral sense which is comforting—that of a worthy, right-thinking citizen. ... His emotional life finds..."
expression in total devotion to others or altruistic sacrifices ... and to enjoy having a charming home." We would all enjoy receiving such a horoscope—which of course, is exactly the point.

The birthdate was actually that of Marcel Petiot, a doctor who posed as an underground agent during World War II. When refugees came to him to escape the Nazis, he took their money, murdered them, and dissolved their bodies in a secret chamber in his house. After the war, he was convicted of murdering 27 people; before his execution he boasted he really killed 63.

Next, Gauguelin placed an advertisement in a Paris newspaper, offering "totally free, ultra-personal horoscopes." There were 150 replies. To each he sent the same horoscope—the one he had received for Dr. Petiot. With each horoscope he sent a questionnaire asking about the accuracy of the reading. Ninety-four percent replied that they were pleased—that they have benefited from the experience. Astrology works well—and I know why. (Could a horoscope be tax-deductible as a business expense?)

To an appalling degree people today believe in the validity of personal experiences. Telling a story that ends with "... so it's because of my own personal experience that I believe such and such ..." can be an effective use of a minute that the audience will remember far longer than they'll recall a scientific argument.

A good salesman would make a statement he would expect the audience to agree with rather than react to. The goal is to get your audience to say yes to you, not to become defensive.

Don't appeal to authority (the audience won't care).

The greatest scientist in the world could have published the most definitive study on the subject, but your audience won't know who he is and won't care about his results—"at least not in the time you have to explain it (unless you have enough time to make a story out of it). Someone will point out that Kepler cast horoscopes and you're back to square one. I carry a list of studies folded in my pocket to brandish as a prop if needed to make the point that "this whole list of people studied this in detail and you can read about their results" without taking the time to go into detail.

"We astronomers know all about planetary alignments, and we know for a fact that the planets exert no meaningful tidal forces on the earth" is a poor start if you don't have at least several minutes to develop an understanding of why this is so. No good salesman would issue such a challenge and expect agreement in return. A good salesman would make a statement he would expect the audience to agree with rather than react to. The goal is to get your audience to say yes to you, not to become defensive. The audience won't be inclined to take an expert's word just because he claims to speak for the experts of the world. This is especially true in a world where people increasingly confuse experiences with facts.

Scientists should not be perceived as a monolithic body of know-it-alls who routinely and automatically reject ideas from unanointed outsiders. We don't deny ideas that don't fit into our set of biases because we are the only legitimate holders of the truth. In contrast, we have thought about the problem at hand a lot and we've learned about it. Claiming to be the possessor of the truth, or to know someone who is, will not impress.

The following extract is from the Manchester Guardian, November 10, 1989, p. 29:

Earlier this year Mosley introduced a spectacular planetarium show to counter the waves of credulity and superstition which regularly sweep across California. ... Despite some gentle mocking of the more ludicrous stories, there is no lofty condescension or ex cathedra dismissals of honest beliefs. Mosley does not call down the wrath of science, but shows people how to think critically about what they read, see and hear.

He thinks scientists can put themselves into defensive and potentially authoritarian positions by being too ready to see irrational beliefs as threats to their own disciplines. Some years ago a noted popularizer of astronomy was one of the protagonists in a BBC radio debate on astrology. His thesis seemed to be that anyone who believed in astrology was in need of psychiatric attention. He got some laughs, but the astrologers won the debate.

"You don't have to be mad to believe in astrology," says Mosley, "What you have to do is not really question it."

Use arguments simple enough to be stated or developed in the time you have available, ask people to think for themselves, appeal to the logic of your position (or, even better, to the charm of your story-telling) to persuade, but do not invoke authority.
He believes scientists should be more patient with a poorly educated public. The real villains are the publishers, film producers, and (in the US) TV producers who exploit public credulity to make easy profits. "People have not learned how to think."

It is rare for a scientific institution to face up so candidly and effectively to the problem of pseudoscience. ... Mosley's approach is the essence of science. He simply asks people to think for themselves, to question, and above all to demand evidence.

Use arguments simple enough to be stated or developed in the time you have available, ask people to think for themselves, appeal to the logic of your position (or, even better, to the charm of your story-telling) to persuade, but do not invoke authority.

Be sympathetic, not arrogant. Don't be dismissive or deny personal experiences (you will lose sympathy). Show that you understand your opponents' arguments. Exude wisdom and confidence.

I try to exude confidence while staying this side of arrogance and to give the impression that I have complete mastery of the subject. It's old hat to me, and I see beyond their games to what is really at the bottom of it all.

I like to begin a debate with an astrologer by stating, "I agree—astrology does work. As practiced today, it works quite well. Most people who visit an astrologer come away satisfied and feeling that they have benefited from the experience. Astrology works well—and I know why!"

The host is astonished and astrologer guests are completely off guard. I continue that what I mean is that visiting an astrologer or having a horoscope cast can be a fulfilling and personally satisfying experience. Someone holds your hand, looks you in the eye, and explains how you are connected to the cosmos and how forces far greater than us are shaping our destinies. Generally flattering things are said, and you're happy that someone cares. You probably get some vaguely useful advice about the future, and who wouldn't welcome that. So the experience itself can be very rewarding, which is precisely why so many people go to astronomers and why astrology is still around. Everyone's happy. Everyone gets something, and in that sense it does work.

But what really happens is that a person who wants help and advice gets some personal attention from a kindly authority figure, and that's the sum of the reward. The planets have nothing to do with it. All the mumbo-jumbo about ascensions and quadrants and whatever is to make the astrologer seem to have authentic knowledge of a difficult subject, but in reality the charts and horoscope are smoke screens to deflect your attention from what is really going on, which is a cold reading. It's an old carnival side-show trick, and it works equally well if you use planets, tea leaves (pull out tea bag here), goat intestines, or a crystal ball (don't pull out goat intestines). Using a computer doesn't change things: garbage in, garbage out. The planets have nothing to do with it.

Where astrological advice does no harm, it probably doesn't matter and its just entertainment. When a person seriously needs professional help, he or she is poorly served by a fortune-teller. We've learned through painful experience that it is necessary to restrict medical practice to trained professionals; astrologers are practicing psychology without a license.

The bottom line is, we astronomers don't disbelieve astrology because we can't explain it, but because we do understand it and it bores us. A few thousand years ago when no one understood nature, it might have sounded plausible.
To an appalling degree people today believe in the validity of personal experiences. Telling a story that ends with "... so it's because of my own personal experience that I believe such and such ..." can be an effective use of a minute that the audience will remember far longer than they'll recall a scientific argument.

ble, but we've learned a lot since then. Been there, done that. Astronomers have moved on to where the real excitement is: black holes, quasars, the big bang ... I try to exude confidence while staying this side of arrogance and to give the impression that I have complete mastery of the subject. It's old hat to me, and I see beyond their games to what is really at the bottom of it all.

People who are assured and relaxed "score more points" in a debate than people who are frenetic, restive, and over-anxious. It might be good to be intense, but it must be kept under control and you must not appear to be too aggressive. Evoke "masterly wisdom." You've "been there, done that." You've seen it all, you've heard it all, and you're beyond that. You're not bored, but nether are you hostile. You're sympathetic (not condescending) to those who haven't reached your level of understanding. It's not their fault they don't have your experience. Your job as an expert is to calmly explain what the score is.

Do not negate anyone's personal experiences. That is bad salesmanship. You will seldom convince a person by an appeal to logic that his or her personal experience is faulty—especially in the time you are likely to have on the air. You will be seen as unsympathetic at best. ... Accept the experience and put your own spin on it.

**Rehearse, Rehearse, Rehearse.**

We've all had the experience of thinking of that knockout retort or witty reply we wish we'd said—while in the way home. You won't get a second chance to be especially clever. Work it out in advance by practicing your lines and avoid the regrets of opportunities lost. You may never speak to a larger audience.

At some point, you may choose to send out a press release prepared on your stationery and take the initiative.

Do not negate anyone's personal experiences. That is bad salesmanship. You will seldom convince a person by an appeal to logic that his or her personal experience is faulty—especially in the time you are likely to have on the air. You will be seen as unsympathetic at best. ... Accept the experience and put your own spin on it.

**Suggested Selected Readings:**


Two thorough bibliographies are:


Any number of commercial and shareware astronomy programs will show the planetary alignments. See "Software Roundup 1995" in the August 1995 *Sky and Telescope* for recommendations. I used *Voyager II*, (Mac), Carina Software, 12919 Alcosita Blvd. #7, San Ramon, CA 94583, fax 510-355-1268; *Starry Night*, (Mac), Sienna Software, 105 Pears Avenue, Toronto, Ontario Canada, contact@siennasoftware.com; and *AstroVizier*, (DOS), Zephyr Services, 1900 Murray Avenue, Pittsburgh, PA 15217, 412-422-9930. My comprehensive and constantly updated list of astronomy software is posted on the Internet World Wide Web at the following site: http://www.skypub.com/software/mosley.html.
The M.A.P.S. '95 Starlab Conference

Gloria Rall, Jerry Vinski, Dayle Brown, Kevin Conod, John Meader, Susan Reynolds

The use of portable planetariums, particularly in schools, is the fastest growing segment of the planetarium profession. Yet, in the approximately twenty years portables have been available, there has been little interaction between teachers using portables and other planetarium professionals. It is rare to meet a portable teacher at a planetarium conference. In fact, it is probable that most portable teachers do not know of the existence of planetarium associations.

Those of us planetarians who have contact with such teachers have noted they would benefit from membership in planetarium organizations. The typical portable teacher tends to have only the most rudimentary training in astronomy or teaching in a planetarium. No journal or training program serves them. They work mostly in isolation with no knowledge of or interaction with other planetarium teachers.

The 1995 Middle Atlantic Planetarium Society Conference offered a unique opportunity to address these problems. It was scheduled to be held at Raritan Valley Community College Planetarium in Somerville, New Jersey. At the college there was a site large enough to install several portables for the duration of the conference. Jerry Vinski, director of the planetarium and conference host, and Gloria Rall of the New Jersey State Planetarium have extensive experience teaching in portables and training teachers to use portables. Because of this experience and interest they decided to devote a portion of the conference to the problems of teachers using portables.

Jerry and Gloria thought the only way of attracting portable teachers to the conference was to devote an entire day to training for these teachers rather than inviting them to the conference. So it was decided that one day of the conference would be devoted to invited presenters demonstrating lessons and other materials appropriate for portables. Simultaneously the regular sessions of the M.A.P.S. conference would be in session.

The New Jersey teachers, who also do teacher training, were asked to identify the types of presentations they thought were appropriate. They suggested training participants in how to teach certain topics. They identified subject areas of particular interest to portable teachers. Those subjects were ethnic astronomy (particularly Native American, Chinese and African sky lore), navigation, and the Planetarium Activities for Student Success (PASS lessons) published by the Lawrence Hall of Science. They suggested that teachers needed classroom material to accompany planetarium lessons. They also suggested that some time should be spent addressing the problems of developing a curriculum for use in portables and how to make teacher training more available. These discussions highlighted a general trend common to portable teachers. Their understanding of potential subject matter tends to be limited to materials marketed by Learning Technologies. (Learning Technologies sells Starlab, the most widely used portable planetarium. Most portable teachers are elementary school teachers who have very little experience identifying topics for possible lessons. Other than the material supplied by Learning Technologies, sky identification and the solar system are the only astronomical topics with which they are familiar.

The format of the conference was also settled. It would be one day from 8:30 A.M. to 4 P.M. Four portable planetariums would be utilized with simultaneous sessions running in each planetarium. Teacher training and curriculum would be covered as a panel discussion.

The next problem was to locate presenters. The teachers had no suggestions. They did not know of any teachers but themselves who used a portable. Two of the teachers volunteered to do demonstration lessons with accompanying workshops on classroom activities. The third volunteered to participate in the panel presentation.

Identification of the remainder of presenters thus fell to Tom, Jerry, and Gloria. This proved difficult. Three well known experienced portable professionals (Dayle Brown, John Meader, and Susan Reynolds) were easy to choose and were invited. However, to pay their travel costs, the travel costs for other presenters had to be minimal (which meant all other presenters had to live close to Somerville). Since there are over a hundred Starlab owners in the area, choosing other presenters should have been easy. But we had no means of identifying these people or screening their qualifications.

Eventually the following topics were chosen (partially based on the ability to locate presenters).

Planetarium Lessons
1. Woodland Native American Astronomy—Middle and High School Level
2. Navigation—Middle and High School
3. Colors of Space & Light and Your Eyes (PASS Activity)—Fourth through Sixth Grades
4. How Big is the Universe (PASS activity)—Middle School to High School
5. Astronomy of the Americas (PASS activity)—Middle to High School
6. Native American Sky Legends—Elementary School
Jerry and Gloria’s decision because of their did this. were the chief means by which news of the northern Virginia, but we felt only those seventy. As possible in the school year. In addition, did not attend. to come in swiftly and early. We originally to have limited the conference to sixty exposure. Participants overwhelmingly registered ference in ambiance nor the importance of The next problem was publicity. No directory of portable users exist. (IPS is currently trying to compile and publish such a directory. This is badly needed. Many teachers are trained to use portables by museums or colleges and then are able to borrow or rent portables from these sources. There needs to be a way to contact those teachers). Learning Technologies was agreeable to mailing flyers to Starlab owners. Three hundred fliers were mailed to owners in New York, Pennsylvania, New Jersey, Delaware, and Maryland. M.A.P.S. serves New England south through northern Virginia, but we felt only those teachers fairly close to the conference site would attend. Fliers were mailed in November, 1994, since it seemed advantageous to notify schools and teachers as early as possible in the school year. In addition, press releases were sent to appropriate education journals and bulletins. The registration deadline was April 21, 1995. Responses began to come in swiftly and early. We originally had intended to limit the conference to sixty teachers, but due to demand we accepted seventy. Of all those registering, only three did not attend.

We have no way of absolutely knowing, but apparently the fliers and word of mouth were the chief means by which news of the conference spread. We received calls from teachers who did not receive the flier because they lived outside the publicity area but who did hear of the conference by some other route. One teacher came all the way from Florida.

Through the year many teachers who were experienced Starlab users learned of the conference and called to volunteer to serve as presenters. This allowed us to identify a potential pool of presenters that could be called upon in the future. To all those teachers we suggested that they join M.A.P.S. and respond to the call for papers. None did. (As well as the day spent on teacher training, the portables were also available on another day for workshops and papers that were responses to the call for papers). All participants were scheduled to attend the demonstration on equipment and maintenance and the panel discussion. Otherwise they chose the sessions they attended. To hold attendance to 25 people per session (this represents the maximum number of adults a Starlab can hold), attendees were asked to preregister for the sessions of their choice. About two-thirds of them actually did this. One third had to be given schedules the day of the conference.

Participants overwhelmingly registered for the elementary lessons on Indian Myth-ology, Lunar Antics, and Colors of Space. Few registered for navigation, the panarama projector, and How Big is the Universe. All the other topics had full attendance, but it was not necessary to turn people away because of overflow registration. Only about one third of the teachers attended the panel discussion.

A critique was given to the participants at the end of the day (which was completed by approximately one third) and virtually all aspects of the conference received good to excellent marks. The presenters and conference planners are of the opinion that most attendees considered the day worthwhile and fun.

Before the conference the planners had strongly suspected that most portable teachers think of a planetarium in terms of multimedia programs that can be done only by experts in astronomy…. As a result they view their own facility as not quite a real planetarium and one that is limited in scope. That was the reason for the emphasis on equipment and the reason we had all of them attend the session on equipment.

The results seem to indicate this suspicion is correct. John Meader is an experienced planetarium professional who, with his wife, now operates his own Starlab business. In his planetarium he has designed and built many special effects projectors for portables that are sturdy, inexpensive, and as professional in projection as any commercial projector. In his presentation the attendees saw a portable planetarium transformed elegantly and inexpensively into a “real planetarium”. The participants came to understand that there is a relationship between their portables and stationary planetariums. The teachers were absolutely delighted with his presentation and were obviously stimulated to begin thinking in new ways. Now they could have a Milky Way projector, a meridian projector, a meteor projector etc. As an example of just how effective some very simple things can be, a number of the participants expressed surprise at the effectiveness of one simple device: carpeting on the floor. They had not realized that carpeting makes a dramatic difference in ambiance nor the importance of ambiance in the planetarium environment. It is also clear that this presentation brought the instant recognition that portables are “real planetariums”.

Most did not know of single-slide projectors, and, as with John’s presentation, they were thoroughly surprised and pleased to learn what could be done with these simple, inexpensive projectors.

As an example of how to build and use a brute force projector, Dayle Brown showed them how to construct for $15 an extremely effective panorama projector and how to develop artwork for it at a low cost. Few had signed up for that presentation, most likely because they did not know what panorama projectors were or their uses. Once shown they were enthusiastic, and Dayle spent most of the day showing small groups of them how to do it. Even though they might not have registered for it, it seems safe to assume that most of them actually did spend time with Dayle learning how to construct the projector.

Very few signed up for the session on navigation, and this might be because they think of it as the precise science used by navigators, and that doesn’t seem relevant to them. Navigation in a broader sense is probably unfamiliar to them. We showed them...
“Follow The Drinking Gourd” as an example of how to adapt a purchased planetarium show kit to a portable and, more importantly, as a good example of an interdisciplinary program. They probably registered for it because it was listed as a topic in both American history and astronomy. Many were surprised when it was pointed out to them that the actual astronomy lesson in that program is navigation. They simply had never thought of navigation in a broader sense. (The show explains how slaves fled the Anti-Bellum South by navigating by the Big Dipper).

Stu and Carol Chapman of the Harverford County School System in Maryland developed most of the instructional material in the teacher’s guide for “Follow the Drinking Gourd”. They were on hand to explain how the material in the program is used by teachers in their district in a coordinated study of astronomy, black history, and the Underground Railroad. From their questions it is clear that many portable teachers are struggling with the problem of how to develop interdisciplinary material and how to fit such material into the school agenda.

Above all, the teachers were delighted to be able to end the isolation in which they work. They were surprised and pleased to learn just how friendly and helpful the entire planetarium community is and how much help and support is available.

Because it was a new activity, the budget we developed was a bare bones budget. Since the prospective attendees (and their employers) were not familiar with M.A.P.S., we decided to charge a minimal registration fee because we did not want a high fee to inhibit attendance. The goal was a good conference on as little money as possible. Fees from participants had to pay for the conference. Using that budget, we had most of the conference planned and the money committed to those expenses long before registration started. Then we hoped for an adequate registration. The conference was a success, and as a result we feel that a more generous budget could be planned for future conferences or activities. Clearly teachers are willing to come and their school districts are willing to pay. Since it proved to be a success, raising money from other sources to help support educational programs for portable teachers would also be a viable alternative for future conferences. We have recommended to the M.A.P.S. Board that the money left over from this conference be used as seed money for another portable activity.

Predictably, the planners and presenters learned as much as the attendees. To the best of our knowledge this is the first major conference devoted entirely to portables. We learned by doing.

There were many small things that did not go as smoothly as we would have liked due to lack of experience. In retrospect, we feel strongly that we should have planned some activities that included both regular M.A.P.S. members and teachers attending the training sessions so the two could have intermingled. The only time they met each other was lunch. Both groups were curious about each other and would have like more time together. We also did two different conference agendas with each group receiving their own agenda. In hindsight it is clear both agendas should have gone to everyone.

George Reed (who moderated the panel discussion) had little experience with portables before the conference. He was so curious he spent the whole day visiting with participants and did an excellent presentation on the history of planetariums.

He noted that we were seeing a cycle repeat for the third time. The first generation of planetariums first concentrated on observational astronomy and its underlying reasons (why does Earth have seasons, why does the sky change seasonally, etc.) and then progressed to emphasis on broader subjects and to a multi-media approach. The cycle repeated with the introduction of the small Spitz school planetarium. It is now repeating with portables.

There is one major difference in history between portables and the small stationary planetarium. The latter represented a major investment by a school district and was meant to serve all students in the district. A teacher was assigned full time and given support from the school district to develop skills and expertise. Thus, those early teachers had the incentive and support to seek out planetarium organizations. They became very active in those organizations and they came to play a major role in shaping them. In contrast,
Exchanging Planetarium Information on the Internet

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This is a short guide to methods for exchanging planetarium information for folk who are relative newcomers to the Internet.

There are now at least three Internet modes for exchange of planetarium-related information: a listserv named “Dome-L,” Worldwide Web (WWW) pages for a variety of planetariums, related organizations and companies, and a newsgroup named “sci.astro.planetarium”.

1. WWW


2. Dome-L

You can communicate with other planetarians via the listserv “Dome-L@listserv.unc.edu”, administered by Tom Hocking <starman@unc.edu>. A listserv is an automated mail system—once you subscribe, you can send a message to the listserv <Dome-L@listserv.unc.edu>, and your message is automatically mailed to all the subscribers. Likewise, you receive all messages sent by other subscribers. There are now over 300 planetarians and planetarium enthusiasts subscribed to Dome-L. This is a good place to ask those difficult questions that you want answers to, or provide assistance to your colleagues with valuable information you have acquired over the years.

To subscribe to the DOME-L listserv, send email to: listserve@listserv.unc.edu

No subject line needed
The body of your message should be a one-line command as follows:

subscribe DOME-L <firstname lastname>

Example:
subscribe DOME-L Joe Schmoe

Once you subscribe, you will soon receive a standard message containing info about how the listserv works. You can submit post-ings directly to the “Dome-L@listserv.unc.edu” address. Your postings automatically go out to all subscribers within a day and you automatically receive all postings.

Explanation of the two addresses:
“listserv@listserv.unc.edu” is the name of the “list server” which serves many lists. “Dome-L@listserv.unc.edu” is the planetarians’ listserv and is but one of many lists.


In September ’93, a newsgroup named “sci.astro.planetarium” was created. It can be accessed on USENET. The newsgroup is another good place to ask/answer critical questions about planetariums.

If you are connected to the Internet through a college, university or other group with full access to Internet, you can probably access the USENET where all the newsgroups reside. I have been providing a service to planetarians with commercial accounts and other folks who have no direct USENET newsgroup access (or who just want the convenience of having the newsgroup postings appear in their email), to send out copies of the postings that appear on sci.astro.planetarium (“sap”). If you wish for me to add you to this “sap” mailing list, let me know and I can do so with very little effort.

*******************************

Dome-L generally does not have as much “noise” or “clutter” unrelated to planetarium affairs as does sci.astro.planetarium, though the newsgroup is relatively well behaved compared to some others. Both of these entities (Dome-L and sci.astro.planetarium) sprang from the “Planetarians Electronic Newsletter (PEN)” which I started in May of 1993. PEN was distributed via simple electronic mailing list from May to September, 1993, the last issue being PEN #16 on 9/6/93. At that time, PEN was replaced by the two easier electronic communication methods described above.

I still am providing the two functions of (1) keeping a listing of Dome-L subscriber institution and city names—data which is not kept in the listserv automatically. I post new postings to Dome-L@listserv.unc.edu. For questions about Dome-L, contact Tom Hocking <starman@unc.edu>.

In addition, I keep a mailing list for people who want to receive all the sci.astro.planetarium postings to their “email door” nearly every day (except when I’m on vacation). ★

(Starlab, continued from page 26)

the typical portable teacher is a teacher who may use the portable only a few days a year and very often for only that teacher’s students. It is much harder for them to develop the skills to become a professional planetarium, and they need much more help. Lying in the files of every school planetarium is material portable teachers could use, and extended contact with experienced, stationary school planetarians would be invaluable. Otherwise portable teachers will struggle alone to reinvent the wheel.

Portables have been marketed as a tool any teacher can use. It’s true that any teacher can swiftly master the mechanics, but teaching well in a portable takes experience and support. Probably few school districts realize this, or, if they do, have not the expertise themselves to utilize fully the portable planetarium. Probably they have the all too common view that it is not a real planetarium and they have no vision of the possibilities that a portable offers.

We experienced planetarians have too long ignored the portable. It is time to get their users into the mainstream of planetarium professionals. ★
Invitation to IPS 2000
Invitations from Five Institutions to Host the 2000 IPS Conference

Invitation to Calgary

The Science Centre
701-11 Street SW
Calgary, Alberta
Canada

Come to Calgary in 2000, and bring along your best "yee-haw!" The IPS 2000 conference in Calgary, Alberta, Canada will be a conference to remember and a wonderful time for all. Calgary's Science Centre, the Calgary Convention and Visitors Bureau and the City of Calgary invite you to join us at the end of May, 2000, in Canada's most hospitable city for the IPS 2000 Conference.

Not only will this be a tremendous opportunity to see the wonder and beauty of Calgary and the Canadian Rockies, it will also be an exciting time for you to see the "new" Science Centre, as we will have undergone some very exciting changes in our own facility.

Calgary—an international city

Calgary is truly an international centre. As host of the annual Calgary Stampede, host of the 1988 Winter Olympic Games, and a contender for Expo 2005, the world over has come to love our city and the surrounding areas.

Calgary is situated between the spectacular Rocky Mountains (to our west), with the stunning prairies to our east. An easy 1-hour drive will take us to the Rockies' Kananaskis Country, or another half-hour to the infamous town of Banff. The Royal Tyrell Museum is just 2 hours north in Drumheller, and the unique and fascinating 'Head-Smashed-In-Buffalo-Jump' just 2 hours to the south. Within our city, world-class attractions include the Glenbow Museum, Heritage Park Historical Village, the Calgary Zoo and Botanical Gardens, Canada Olympic Park, and more.

Calgary is an aviation hub of Western Canada. Flight connections to the Calgary International Airport are easy to make from anywhere in the world. In addition, The Science Centre will be working with our home-town airline, Canadian Airlines International, and its partner American Airlines so that IPS members can get to Calgary economi-
Things are happening at the Calgary Science Centre!
The Science Centre itself is undergoing tremendous and exciting changes. Our planetarium is currently being renovated, for opening in June, 1996. Our new theatre will be a multi-media production facility—the best of its kind in North America! By 2000 we expect to add a major exhibit hall and a motion simulator, in addition to our existing observatory and exhibit hall. We are an interesting, energetic, growing facility with a staff and volunteers whose enthusiasm will add real spark, energy and richness of content to the IPS Conference. To assure that the conference happens with professionalism and efficiency, we expect to augment the efforts of our staff and volunteers with those of a conference planning and production firm.

It won't be a question of what to do ...

At the IPS 2000 Conference in Calgary, it won't be a question of what can we do—but what can we fit in! Our Conference activities will encompass lectures & workshops consistent with the needs of IPS members. In addition, we will plan excursions and other activities in the area for both you and your family’s enjoyment. As noted above, the activities and attractions in the Calgary area are numerous. From a Luge ride at Canada Olympic Park, to a ride on an antique midway—its all here, and we look forward to showing you our city.

Calgary—“Her Mountains will move you. Her people will bring you back. Minutes from adventure in an unspoiled mountain playground, Calgary is clean and safe; a big city without big city problems. Her friendly people will embrace you. Her beauty and western Canadian heritage will inspire you.”

Join us, your hosts The Science Centre, in this beautiful city for an invigorating, enlightening and enjoyable IPS Conference 2000!

Invitation to Charlotte

Sue Griswold
Discovery Place
301 N. Tryon Street
Charlotte, North Carolina 28202

Discovery Place in Charlotte, N.C. is one of the top 10 science centers in the United States. It features The Kelly Space Voyager Planetarium, a 307 seat, tilted dome theatre which combines Omnimax film projection with a sophisticated planetarium system. The Space Voyager, built by Spitz Space Systems, accurately and realistically reproduces the stars and solar system as seen from any point on Earth, or any point in space within 100 astronomical units of the Sun. The Space Voyager starball projects over 10,000 stars over 200 special effects enhance each star show. We are pleased to extend an invitation to the members of the International Planetarium Society to hold their summer 2000 conference at our facility. Our proposed dates for the conference are July 14-18, 2000.

In addition to the planetarium theatre, Discovery Place offers many other exciting programs and exhibits that will be sure to please IPS delegates from around the world. If you want to step inside a giant eyeball, handle a real brain, pet a spine iguana, or navigate a simulated space mission, Discovery Place is the place. Since it opened in 1981, the science and technology center in Charlotte has provided hands-on fun and learning for over 500,000 visitors each year. The new Michael J. Smith Wing, named for the North Carolina Challenger shuttle astronaut, was added to Discovery Place in 1991, expanding the size of the facility to over 15,000 sq. m.

There are many varied science areas of the museum and a complete tour can take several days. Kids’ Place is where young children can splash in flowing water, build a tower out of large, soft blocks and view a puppet show that focuses on animals and the environment. The Life Center offers exhibits and programs about health and the human body. Science Circus is where you will find dozens
of exhibits that invite you to turn a wheel, send a whispered message across the museum, and make your hair stand on end. A recently completed astronomy exhibit area, called Astronomy—How Do We Know? includes exhibits on gravity, light, distance and motion in space. This $1.1 million project received major funding from the National Science Foundation.

A Challenger Learning Center, one of 30 located in schools, museums and science centers across the U.S. and Canada, allows participants to work in Mission Control or in a simulated Space Station. They problem-solve, practice communications skills, and learn about the Earth and space. Many visitors choose to combine a visit to the planetarium and Omnimax theatre with a trip aboard the Challenger Space Station.

A unique area of Discovery Place is the rainforest and aquarium. This giant 3-story glass-enclosed rainforest is a peaceful haven where waterfalls and the sound of tropical birds provide an opportunity for quiet reflection. The aquariums allow visitors to view up-close creatures such as sharks, mountain trout and an octopus from the Pacific northwest. Everywhere there are staff members and volunteers who allow you to touch some of the exotic creatures, or explain many of the science principles involved in the exhibits and programs.

Discovery Place has been the site of several large, national and international conferences such as the Association of Science-Technology Centers, International Council of Museums, International Space Theatre Consortium and the Southeastern Planetarium Association. We have the facilities, staff and enthusiasm necessary to host the International Planetarium Society. Working with the officers and committees of the IPS, Discovery Place will develop a conference agenda that offers a wide range of planetarium programs, workshops, seminars and discussions to further the planetarium profession. A very active local Amateur Astronomers Club will arrange star parties during the conference.

Charlotte is the center of the nation's fifth largest urban region. Over five million people live within a 160 kilometer radius of Charlotte. The Charlotte-Douglas International Airport, only 15 minutes from uptown, has over 500 daily flights. Two major interstates, I-77 and I-85, intersect in Charlotte and link the city to the Great Lakes region, New England and Florida. I-40, which stretches westward across the nation, is only one hour north of Charlotte.

Hotel facilities within two blocks of Discovery Place include the 431-room
Marriott City Center, the 300-room Holiday Inn, the 410-room Omni Charlotte Hotel and the 386-room Radisson Plaza. Lodging costs for large groups can generally be negotiated to between $60 and $70. The Charlotte Convention and Visitors Bureau will assist with conference and lodging registrations and will provide information about the city and surrounding attractions. Possible side excursions include the Blue Ridge Parkway, Biltmore Estate, Pinehurst Golf Resort, and the beautiful Carolina Coast. A mild, sunbelt climate awaits you in Charlotte. During July, anticipate temperatures of 31° C highs to lows of 20° C.

Discovery Place, located at 301 North Tryon St. in uptown Charlotte, is open 363 days per year. Recently named Travel Attraction of the Year for the Southeast, this vibrant science and technology center has something for everyone. Come share our southern hospitality at IPS 2000 in Charlotte, North Carolina.

Invitation to Chicago

Paul H. Knappenberger, Jr. Ph.D., President
Adler Planetarium and Astronomy Museum
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Chicago, Illinois 60605 USA
fax 312-322-9909
http://astro.uchicago.edu/adler/

The Adler Planetarium and Astronomical Museum of Chicago is offering our staff, facilities and world-class city to the International Planetarium Society for its biennial meeting in June of the year 2000.

Chicago's Central Location

The Adler in Chicago provides a central site in North America that will be attractive to a large percentage of IPS membership. Travel to Chicago is convenient with a multitude of domestic and international flights through Chicago's O'Hare International Airport, access to an extensive network of Amtrak passenger trains and major bus lines, plus a central location that will allow many to drive, resulting in lower conference expenses. Chicago is a world-class city filled with hotels in a range of affordable accommodations and the ability to attract a great many vendors, allowing some expenses to be funded from display fees and sponsored meals.

The conference headquarters will be at one of Chicago's large hotels accustomed to accommodating major conferences. There will be ample meeting rooms, audio-visual equipment, support staff, and dining facilities. The Museum Campus is easily reached by bus and taxi. A less expensive hotel and nearby university dormitory facility will provide housing for those with more restricted budgets.

Chicago as a Destination

1997 will bring the opening of a new, architecturally-striking, wrap-around glass addition to the Adler, providing increased exhibit space and a Digistar Theater. The Adler will have not just one, but three planetarium theaters, each with unique programming: the 1997 Digistar theater, the 1930 Zeiss theater and the 1913 Atwood Globe—a unique 15-foot (4.5-meter) rotating sphere where observers sit inside to view the night sky. By 2000, we will have co-hosted (with the University of Chicago) the 1997 meeting of the Astronomical Society of the Pacific and the 1998 meeting of the American Astronomical Society, plus we will be celebrating the 70th Anniversary of the opening of the Adler Planetarium, the first projection planetarium in the western hemisphere.

Forty thousand square feet (3,800 square meters) of exhibits incorporate the process of science and a world-class collection of historic astronomical instruments, including sundials, armillary spheres, astrolabes, orreries and early telescopes. Modern telescopes include our Doane Observatory’s CCD/computerized 20-inch (0.5-meter) telescope and our currently-unique museum connection via Internet to a 140-inch (3.5-meter) research telescope high atop a mountain in the dark clear skies of the southwestern United States. In addition, visitors to our Cyber Space Learning Center process images themselves with "Hands On Universe" software.

The 20 computers in Cyber Space are linked to the Internet for use with teacher training and the development of science lessons using Internet resources. These lessons are available now on our Homepage (http://astro.uchicago.edu/adler/resources/sol.html).

Conference Activities

During this decade, the Adler has concentrated on effective means of communicating the exploration of the universe to a broad audience. Formative and summative evaluation of the audience experiences is regularly incorporated into the development of our new exhibits and sky shows. From this experience, we propose "Astronomy Education in the New Millennium" as the theme for the conference. The year 2000 is an excellent time to address our profession's responsibilities for the coming millennium.

The conference will provide opportunities for panel discussions, hands-on process-of-science workshops, evaluation techniques, and presentations of the best science-learning experiences of the last millennium. The conclusion to the conference will be an audience-participation discussion of the role of science educators in the coming millennium, leading to recommendations for a set of IPS goals, objectives and strategies.

Our close relationship to astronomers at the local universities and laboratories (University of Chicago, Northwestern, Loyola, Fermilab, Argonne) provides opportunities for IPS members to hear from some of these people and to see some of their facilities while in Chicago. The year 2000 is the
culminating year of a three-year celebration of the Yerkes Observatory Centennial—the world's largest refracting telescope, owned and operated by the University of Chicago.

Other appealing astronomical/science-education connections are with our neighbors, the Field Museum of natural history and the John Shedd aquarium, which have joined with the Adler to form a Museum Campus that embraces the land, sea and sky. The Chicago Meteorites Center is a forming partnership with the Field Museum as curators of a world-class collection, the Geology Department at the University of Chicago as the researchers of meteorites, and the Adler as the public educator using the meteorites. Seven planetariums in greater Chicago will be involved with the planning and programming for the conference.

The evenings will provide opportunities to visit various museums with progressive dinners and behind-the-scenes tours, a boat-cruise dinner on Lake Michigan, an evening at Navy Pier with the Children's Museum and Imax theater, a park picnic with music under the real stars, and a banquet dinner high atop the world's tallest building.

During a pre-trip to St. Louis, we will venture to Cahokia, an early Indian site with the third largest pyramid in the Americas and "Woodhenge" for marking the Sun at the various seasons. A reserved-bus trip northward will take us to the Super Computer facilities at the University of Illinois Champaign-Urbana.

Post-trip plans include visiting Yerkes Observatory for a night of viewing through the world's largest refractor, a boat excursion on beautiful Lake Geneva, a stop at the Time Museum in Rockford, Elgin Transit Observatory, and Fermilab—where the final quark, the Top Quark—was discovered not too long ago.

The cultural richness of Chicago provides an enjoyable vacation destination for IPS members and their families. World renowned museums attract visitors from all over the world; Chicago's Navy Pier provides lakefront entertainment, including restaurants and a marvelous Ferris Wheel; North Pier next door contains virtual-reality arcades, restaurants and shops; June brings Blues Fest and Taste-of-Chicago to nearby Grant Park, not far from the Adler. All of this welcomes participants to the magnificent shores of one of the Earth's largest freshwater lakes—Lake Michigan.

The Adler Planetarium is capable of hosting a memorable millennium meeting. We have eager and experienced staff, the new Adler facility and education programs, and a world-class city at our doorstep. The infrastructure exists here to accommodate a large conference at a reasonable price. All of this adds up to an enticing destination for planetarians from around the world.
The Planétarium de Montréal

The inauguration of the Planétarium de Montréal (originally the Dow Planetarium) in April 1966 was the crowning event of three long years of hard work and planning. The Dow Brewery contributed to the City of Montréal’s touristic appeal and the upcoming World Fair of 1967 with the implementation of a world-class planetarium. The decision was the brainchild of Dr. Pierre Gendron, a chemistry professor and the founding Dean of Faculty of Sciences at the University of Ottawa and, at the time, President of Dow. The architect firm of David-Barrott-Boulva have incorporated astronomical data into their blueprints; for instance, the outdoor construction of the dome is a reminder of Saturn surrounded by its majestic rings. The building and its projection equipment were ready by February 1966 and the inaugural show, “New Skies for a New City,” scheduled for April 4th, was prepared at a feverish pace by a slew of lecturers.

April 4th, 1996 marks the 30th anniversary of the Planétarium de Montréal. This translates into nearly 5 million visitors witnessing 175 shows created by the Planétarium de Montréal. Continuing yesterday’s tradition, the Planétarium de Montréal disseminates scientific knowledge and promotes astronomy to the public in Montréal and throughout the Province of Québec.

It is important to note that the Planétarium de Montréal is administered by the City of Montréal and has been since its opening in 1966. Its personnel are therefore municipal employees. There are three interactive sections: educational programs, technical staff and administration. Fourteen people are full-time; twelve are part-time. While we are mostly self-sufficient, we do contract out some work for the preparation of our shows and exhibitions. For instance, musicians, narrators, designers, etc. are hired for their specific abilities to enhance our projects. Other city employees cooperate with us for major repairs, external maintenance and promotion of the Planétarium de Montréal to the media and the general public.

The Planétarium de Montréal organized the 1989 Conference of the Planetarium Association of Canada; it was an enriching experience for both the personnel and the participants. The staff of the Educational Programs and Administration have, over the years, organized special days, conferences and colloquia on a regular basis. As a matter of fact, our last involvement in such an undertaking was in June 1995 with the Joint Annual Conference of the Canadian Museums Association and the Société des musées québécois.

The organization of the IPS 2000 Conference is a challenge for the entire staff of the Planétarium de Montréal and it is with great enthusiasm and a readiness for a lot of work that we take it up.

The IPS 2000 Conference Themes

As the new millennium draws near, observational astronomy will be more active than ever. There is little doubt that the field of astronomical dissemination and education, including planetaria the world over, will be affected by this feverish pace.

A new generation of optical telescopes such as Subaru, the VLT, Gemini and Magellan with mirrors ranging from eight to ten metres in diameter will then be fully operational and the results of their observations will be published on a regular basis. These new instruments and the scope of their research, projected well beyond the beginning of the new millennium, will be a major theme of this Conference.

Space exploration won’t be forgotten since there will also be the opportunity to highlight major space probes such as Cassini at Saturn, Near Earth Asteroids Rendezvous (NEAR) and others topical at the time of the Conference.

Throughout the Montréal Conference, two major points will be underlined. With the dawning of a new century, it seems apropos that astronomical research projects be reviewed by those who are actively involved in them. The participants will therefore be able to meet professional astronomers, share their love of astronomy with them and discuss current and future activities.

The second point will be the role of a planetarium as a museum. This conference is an appropriate setting to reflect upon the future prospects of planetaria in the fields of education, technology and astronomical dissemination within the current sociological, financial and political context. Therefore, the IPS 2000 Biennial Conference in Montréal would allow participants from planetaria to reflect upon topics related to and affecting their work. This pause would help to refocus and better prepare for the 21st Century.

The IPS 2000 Conference Agenda

Most of the oral presentations in the “Astronomy” portion of the Conference will be done by guest speakers during Special Sessions. However, an active participation
incl uded in the registration fee as well as cost of accommodation, transportation to and from Montréal, transportation to and from the airports, the post-conference tours and other miscellaneous expenses not outlined in the official program.

Montreal: Conveniences

Two airports are within easy reach of Montréal. The Dorval airport is located only a few kilometres from downtown Montréal and is used for all continental flights. Your hotel room is just minutes away by shuttle bus, taxi or limousine. Mirabel, located in a northern suburb of Montréal, handles all intercontinental flights. It takes about one hour to reach downtown Montréal by bus or taxi.

The best way to travel within Montréal is the Métro (subway). It is cheap, allows you to reach quickly and easily the main points of interest in Montréal and provides a different vision of Montréal; its underground city, one of the largest in North America, crammed with stores, boutiques, cinemas and restaurants. Extensive bus routes are also available as are a slew of taxi fleets.

Registration Fees

Preliminary estimate of the registration fee for the IPS 2000 Conference has been established at around CAN $375 to $400. At current exchange rate, this translate approximately into US $285, DM 410, FF 1400 and 31,600 yens. This fee covers the costs of the Conference Package, cultural events, most of the meals and transportation to and fro the hotel and various excursion sites. Please note that participants are financially responsible for the remaining meals not included in the registration fee as well as cost of accommodation, transportation to and from Montréal, transportation to and from the airports, the post-conference tours and other miscellaneous expenses not outlined in the official program.

Special Activities

A visit to the Planétarium de Montréal, with its show and workshops, is obviously on the agenda. The Canadian space industry is highly concentrated around Montréal. So naturally, we plan outings at the Canadian Space Agency, at specialized space industries such as SPAR Aerospace, and the Space Camp in Laval as part of the Conference scheduled activities. Similarly, we are planning to negotiate with the IMAX Theatre at the Old Port of Montréal to organize a special tour of their installations.

Finally, a special activity will be planned with the City of Montréal’s other scientific institutions and the Olympic facilities. Therefore, it will be possible for IPS members to visit the Biodome, the Botanical Garden, the Insectarium as well as the Olympic Tower, the world’s tallest inclined structure. We plan to offer post-conference optional excursions as well: tours of Quebec City and Ottawa provided we have enough participants interested.

Montreal has many hotels and can cater to all the needs of the IPS. Even though hotels boast an occupancy rate of nearly 80% during the month of July, there are still 390,000 rooms available during that period. Further, it will be possible to reserve all the appropriate rooms as early as 1996!

It is difficult to put an exact figure on hotel room rates for the year 2000. However, the Director of the Planétarium de Montréal

from the IPS members is expected for the “Planetarium” part of the Conference. This could be an oral presentation, a workshop or a panel.

Other presentations will take place during poster sessions. This will permit more members to express themselves in writing and to interact with their colleagues. Naturally, the schedule will allow for the standard IPS Conference activities such as the IPS Council Meeting and the IPS Business Meeting.

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was a member of the organizing committee for the Annual Conference of the Canadian Museums Association held in Montréal in June 1995. The participants had a rate of CAN $99 per room, single or double, plus taxes. By extrapolation, we calculated the rate should be approximately CAN $130 - $135 per room plus taxes.

Renowned for the quality and diversity of its gastronomic cuisine, the Greater Montréal is teaming with an extensive range of restaurants to delight the most discriminating tastes. You will also find a wide selection of eateries serving traditional fare to satisfy all appetites, large and small. As far as health and emergency services are concerned, the City of Montréal has many fine hospitals and their emergency response time is quite good. Participants need not worry about this.

Montréal: Sightseeing

For those who enjoy walking in a safe environment and visiting Montréal on their own, there are many places or buildings that deserve a closer look. Here is a partial list:

- City Hall
- Marché Bonsecours (Old City Hall)
- Place Ville-Marie
- Notre-Dame Church
- Mary Queen of the World Cathedral
- Christ-Church Cathedral
- Mont-Royal Cross
- St-Joseph Oratory
- Certain places are hot spots for tourists:
- Montréal Casino (at the Parc des Îles)
- Expotec - annual thematic exhibition, highly interactive (at the Old Port of Montréal)

Montréal: The Arts

If you enjoy visiting museums, you will find in Montréal a huge selection covering a broad spectrum of interests. Here is a partial list of the main museums which underline Montréal's wealth in this area. The IPS members will surely be drawn toward these institutions:

- The Museum of Fine Arts
- McCord Museum of Canadian History
- Canadian Centre for Architecture
- Museum of Contemporary Art
- Pointe-à-Callière, the Montréal Museum of Archeology and History
- Centre d'histoire de Montréal, the history of Montréal
- Château Dufresne, museum of decorative arts

During the summer months, Montréal and some neighbouring cities easily accessible by car, blossom into cultural events. Cultural activities in the fields of dance, music, visual arts, theatre and variety are quite diverse and will change from one year to the next. However, some are so popular and successful, reaching out far beyond Montréal, that they return every year. The following will be in full swing at the time the Conference takes place:

- Montréal International Jazz Festival (usually June 28th to July 9th)
- Just for Laughs Festival (usually July 19th to 30th)
- Lanaudière International Festival - classical music (usually mid-June to end of July)
- Benson & Hedges International Fireworks Competition (June-July)

Many theatres will offer fresh, new plays during the hot season. Perfect if you need to relax and have a good laugh. Conventional cinemas are easily found all over downtown Montréal.

Conclusion

The International Planetarium Society could not choose a better place to hold its Biennial Conference. Montréal is one of the safest and most exotic cities in North America. July is one of the best time of the year to visit our fair city; the days are long and sunny and the weather is warm. Montréal offers a historical setting, a wealth of cultural sights, an endless supply of fine restaurants and one of the best public transportation both above and below ground. Its location allows for quick and easy access to other important Canadian cities such as Québec City, Ottawa and Toronto.

The Planétarium de Montréal offers an innovative, thought-provoking agenda for planetarians from all over the world. The Biennial Conference 2000 is a golden opportunity for the analysis and renewal of strategies on popularization and dissemination of astronomy to the general public. The special activities planned indicate both the access the City of Montréal has to the Canadian space program and the originality the Planétarium de Montréal will breathe into the Biennial Conference.

We cordially extend an invitation to all planetarians to come and visit us for the IPS 2000 Biennial Conference.

Bienvenue à Montréal!

Address for Inquiries:

Secretariat of IPS 2000
c/o Planétarium de Montréal
1000 rue Saint-Jacques Ouest Montréal,
Quebec Canada H3C1G7
Phone: 1 514 872 4530
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pierre_lacombe@astro.umontreal.ca
Invitation to Morelia

Gabriel R. Muñoz B.,
Planetarium Director
Apartado Postal 78
5800 Morelia, Michoacan
Mexico

On behalf of Morelia's Planetarium and Convention Center it is my pleasure to extend an invitation to IPS members to hold the 2000 meeting in the province's capital city Morelia, Michoacan, Mexico.

The Planetarium and the Convention Center are located in the south of Morelia's downtown, among a group of special designed buildings, surrounded by green areas, which consists of a large multiple-use-building with 1109 square meters, three meeting rooms, cafeteria, catering service, a registration area, office for organizers, the Jose Maria Morelos Theater, the Orquidarium and the Planetarium's building site and Auditorium with 176 seats; the Projection Room with a 20-meter dome, 361 seats and a Zeiss Projector IVs; the Lobby with 759 square meters can be used for exhibitions.

Our experts for Mexican and international cuisine will give you just the right finishing touch for our Conference, assemblies and social events for up to 1500 people.

Near the Planetarium we have the Gran Hotel with 253 luxurious guests rooms and suites and four meeting rooms. Two miles away we have the Quality Calinda Hotel with 120 rooms. Both are five stars hotels, and the price is $65 U.S. plus tax, single or double.

There are two four-star hotels. One is the Confort with 80 rooms colonial style, and it's very near from the Calinda. In the heart of the city, a few steps from the Historical Center and less than ten minutes from the Planetarium, is located Alameda Hotel with 116 rooms. The price for either is $50 U.S., plus tax, single or double.

Registration fee will be about $220 U.S. including reception, banquet, transportation between hotels, and an excursion to Tzintzuntzan, Indian's Universe Center.

Morelia is a dynamic, growing, progressive city of a million friendly people, and it's the business, political and cultural capital of Michoacan. Our city has many attractions such as the Benito Juarez Zoo, historical monuments, museums, handicrafts, etc.

We will have papers session, workshops, guest speakers from the Astronomy National Institute of Mexico and the University of Michoacan, folkloric music and square dances, etc.

Optional excursions are for the family members to Patzcuaro, Santa Clara (Copper Village), Zirahuen Lake and Tiripetio (The First University in America). Another one is to Zinappecuaro, to visit Felipe River's house (the discoverer of a nova in Perseus).

The Conference will be in July 9-14, 2000.

The weather is very good with temperatures between 11 and 27 degrees Celsius.

I worked for the IPS 1984 meeting in Monterrey, and we'll make a Post-Conference Tour to the Mayan's zone, so for this experience, I think that Morelia's Planetarium is the best place and "THE WAY IS MICHOACAN, MEXICO", for the year 2000.
Watch the Universe expand right before your very ears!

Yes, you want your audiences to hear the very best from your sky shows, to let their imaginations soar through the cosmos with ethereal music and stellar visuals. But, like many other planetarium theaters, you cannot afford the astronomical costs of a new sound system. And, the sheer bulk of audio components capable of delivering the sound quality you seek may require valuable space where there is none to spare.

Wondering, then, how to expand your universe when you’re out of space? We can help.

We would like to introduce the Universal Sound Matrix (USM), a revolutionary concept in audio engineering that lets your listeners experience flawless sound delivery, without the exorbitant expense of breaking down walls, or having to replace your existing sound system.

A true evolution in the engineering of sound, the USM surrounds your audiences with perfect three-dimensional sound, so real in its delivery, your audiences will hear and see exactly where it’s coming from, focusing their ears on the precision of sound in motion. From every part of your planetarium sky, your audiences will hear music, voice, and sound effects distributed cleanly, evenly, with unequalled clarity and unparalleled balance.

The USM is truly sound worth seeing. You, too, can experience for yourself the expansion of the Universe. Not by looking at the night sky, but by listening to it. And right in the comfort of your own planetarium theater.

For additional information, or, if you wish to hear the Universal Sound Matrix operate in an actual acoustic environment at the Adler Planetarium, contact ASCC-Systems Corporation in Chicago at 312-935-4162.

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Opening the Dome

conducted by Jon U. Bell
Planetarium Director
Hallstrom Planetarium
Indian River Community College
Fort Pierce, Florida 34981

"Opening the Dome" addresses strategies and logistics for conducting active, aggressive real sky observation programs as adjuncts to planetarium shows.

The Comet of the Century in your Planetarium

Well, I’ve just done my first Comet Hale-Bopp interview for a local newspaper reporter; I expect that over the next year the planetarium community will be deluged with public and media inquiries about this long-awaited, spectacular (we hope!) comet apparition.

Bradenton, Florida’s Bishop Planetarium Director John Hare tells me his facility is planning on doing a Hale-Bopp show next autumn, in order to anticipate this demand. And I’ll probably follow suit and do a “Tale of the Comet” program myself.

Doing a planetarium show about the comet a few months before the comet actually becomes visible to the naked eye is a fairly sensible decision. For one thing it anticipates the media and the public demand for information about Hale-Bopp; for another, it doesn’t embarrass you too greatly if at the same time your show talks about “The Comet of the Century,” the comet is laying a celestial egg. Lastly, of course, it gives you a chance to use all those Halley’s Comet slides you’ve got that have been gathering dust for the last ten years.

Although Hale-Bopp looks to be an okay comet apparition, it won’t be getting terribly close to the sun at perihelion (only sneaking just inside one A.U.), and it won’t be especially near the earth when this happens—about 125 million miles. So it’s not a particularly promising presentation; but we can at least hope for something on the order of Comet West.

When the comet enters our evening skies in early summer, I’m also going to need some help from the local amateur astronomy club to provide regularly scheduled guided views of this ghostly luminary. It’s been a bit of an adjustment for me to make in my new job because I had gotten spoiled by always having a well-staffed observatory adjacent to the planetarium when I worked at the Virginia Living Museum.

Now, since I’m the entire staff of the Hallstrom Planetarium, I must rely on “fair weather” friends who may decide not to show up if there’s a hint of clouds. Amateur astronomy clubs can really help you to make that connection between the simulated planetarium sky and the real thing, but astronomy clubs don’t necessarily share the same mission as your planetarium.

For one thing, if you tell the public that telescopes will be available after a show, then the telescopes must be there. It doesn’t matter whether it’s cloudy or not (in 1985, during a scheduled Halley’s Comet viewing out at Yorktown Battlefield, over 300 people showed up in a rainstorm to look for the comet. Luckily we had some slides to show them.)

One way that I’ve been able to get the local astronomy club to commit to coming out even during inclement weather is by first of all letting them know about public expectations, and secondly by telling them that they can educate folks even during cloudy weather. Just set up the telescopes indoors and provide demonstrations using photographs of celestial objects at the other end of the corridor; and while everyone is admiring your cleverness at letting them see “stars,” you can help them understand how telescopes work and what they should look for if they are thinking of purchasing one.

When I put my planetarium schedule together, the first thing I do is to look for any spectacular or noteworthy sky events that can be featured in the show. It’s for this reason that I’m gearing up for a show about the planet Venus, since it’s been so bright in our evening skies of late; and next spring, while Hale-Bopp is doing its thing, I’m planning on doing a show about Mars, since the red planet will then be at opposition and up all night long.

Always the view is toward presenting a program that can stimulate the audience into going outside and observing for themselves a particular sky phenomenon, in the same time frame as that phenomenon’s visibility. It’s for this reason that many of us do star IDs that feature Orion in the winter, Ursa Major and Leo in the spring, Scorpius and Sagittarius in the summer, and Pegasus and Andromeda in the fall.

I wish you all good luck with any plans you may be making for Hale-Bopp. You’ll probably see a show about it, available for you to purchase, at the next planetarium conference you attend.

Meanwhile, here are two more responses from the skywatching survey that was printed in the March 1995 issue of the Planetarian.

Vic Stryker, of the Sunstar Observatory, and currently at the Orion Planetarium in Jels, Denmark, recalled an early childhood memory of his when “the incredibly bright and wondrous full moon would finally come up over the steep and deep east canyon walls, blasting and flooding our picnic sites” out in Sabino Canyon, near Tucson, Arizona.

He also reports skipping school classes to drive the 87 miles to Kitt Peak National Observatory back in 1964. This was a deciding factor in his life. “My ‘extracurricular’ visits and meeting with some of the mountain men and opticians who were up on the mountain realuminizing the 2.1 meter telescope were the spark that really motivated me to want to work with such astronomical doings.”

He also has logged over 6,500 hours of sidewalk astronomy in the western US and Denmark, using two Celestron 20-cm telescopes, a Thousand Oaks white-light filter and a Daystar H-alpha filter.

“I have never failed to be wonderfully fulfilled as the children and adults look through the telescopes and then come to realize … how small indeed we are here aboard our beautiful fragile spacecraft earth.” Earth is Vic’s favorite planet for interpretation, and interactive exhibits at the Orion Planetarium help the visitor to see our planet’s relationship with the rest of the universe.

Telescopically, Vic favors the planet Venus for interpretation because of its display of phases.

Vic reports that Camilla Bacher is the new director at Orion Planetarium. The facility is “almost ideal”, with 40 foot (12 meter) dome and a Zeiss Skymaster star projector, a small observatory and a “visitors center with a large auditorium and a thriving and busy cafe and gift shop.”

The weather in Denmark is a little different from the clear skies of Arizona—it “can be clear, cloudy, foggy, rainy, sleety, snowy and then exasperatingly clear again within just 3-4 hours”.

(Please see Opening on page 82)
Ever since the discovery of ancient bones and the first use of the word "dinosaur" to describe the creatures they once were, people around the world have been fascinated by these prehistoric beasts.

Now, your audiences too can share the excitement and wonder at the diversity and magnificence of these beings who once dominated the earth as no other group of creatures has since.

Presented in a smoothly-flowing narrative style, "Dinosaurs!" takes your audience back for the feel of the time of the dinosaurs and explains how geologic time works in a method that is at once effective and easily understood.

By using fresh, new and exciting depictions of the dinosaurs themselves (more than twenty overall), this dynamic show answers the following questions:

- Exactly what were the dinosaurs?
- Were all creatures of that time dinosaurs?
- Are there any dinosaurs left?
- How big were they?
- Did they live all over the world?
- What did they eat?
- How did they die?
- How did we find out about them?

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Well ... I wonder where Jupiter is hiding all its water?
A relative scarcity of that otherwise popular substance, plus a relative abundance of the decidedly inert krypton and xenon, plus that fact that the Galileo probe apparently lasted for 57 minutes are the only bits of information that have leaked out, as of this writing, about the Galileo probe mission—thanks to the partial shutdown of the U.S. government which has delayed the press conference planned for December 19.
Fortunately, the press conference has been rescheduled, so we'll know a great deal more about what's new from Jupiter by the time you read this. But such a way to run a space program—or a government, for that matter.

Do-It-Yourself Rocketry
If you want to make an impact on the current state of affairs in space exploration, have you ever thought about investing in a privately-funded commercial launch vehicle?
Late last year—about the time Galileo reached Jupiter and not long before the government partly shut down—I received a mailing from Jerome Wright, CEO of a company called General Astronautics Corporation, 802-810 West Broadway, Vancouver, British Columbia V5Z 4C9 Canada, telephone 604-876-7640, e-mail jlwright@cyberstore.ca, suggesting just such a proposition.
General Astronautics, according to the literature I received, is an international company formed to provide commercial launch services with a vehicle named Urania. Initially expendable, the rocket is designed to launch primarily small to medium-sized communications spacecraft into equatorial and near-polar orbits—for which the company sees a booming business in the coming years.
Urania will depend largely on existing technology, employing Apollo-era concepts, liquid oxygen and kerosene propellants, and a simple design using a core stage surrounded by up to six booster modules to hurl payloads of up to six metric tons into a 120 nautical mile (220 km) orbit. The company plans to use aerospace companies in Canada, Europe and the U.S., with engines supplied by TRW Corp., to develop a low-cost and reliable space transportation system. Starting out with cargo, the company eventually hopes to develop reusable and people-carrying booster technologies as well.
It's not the first such company I've seen pop up over the years, but with the U.S. government, for example, making noises about getting NASA out of the commercial launch business to concentrate exclusively on scientific research, perhaps there's no time like the present to indulge.
If you'd like to receive a prospectus (with no obligation) contact as given above.

Six Songs for Stephen Hawking
Bill Gutsch recently passed me an interesting and esoteric little musical cassette entitled "Six Songs for Stephen Hawking," available from Gold Penny Productions, Berkeley, California USA, telephone 510-524-6049. The songs, according to the album notes, were "suggested by events in Stephen Hawking's life and ideas from his book about cosmology and the origins of the universe, 'A Brief History of Time.'"

The songs, with words by Judith Goldhaber and music by Carl Pennypacker, range in length from about four to eight-and-a-half minutes and are preceded by quotations from Hawking's book, plus occasional other sources. The songs themselves use an ensemble of four voices and actual musical instruments (as opposed to digitized or sampled sounds).
It's not "top forty" stuff; the style here is quite reminiscent of recitatives. I found the songs pleasant (if a bit long) with some nice music and interesting sentiments expressed, but somewhat esoteric and requiring a careful selection of audience, I think. Still, Hawking fans are legion, and they might enjoy the connection.
I have no information on cost; if it's similar to other musical cassettes, it probably runs around $10 U.S. Contact the company to see if you can get a preview copy.

Catalogs
The latest crop is in, including the 1996 Sky Publishing Corp. Catalog from Sky Publishing Corp. P.O. Box 9111, Belmont, Massachusetts 02178 USA. It's filled to the brim with goodies, including many new items: a 12-inch (31 cm) Venus globe displaying Magellan results, new software packages and slide sets, and of course, new books—including David Levy's Impact Jupiter on you-know-which event, and Stephen Maran's Hubble Picturing the Universe, featuring some of the (currently) best Hubble images. You can order (and perhaps get a copy of the catalog) by calling 800-253-0245, and, outside the U.S. and Canada, 617-864-7360.
Edmund Scientific, 101 East Gloucester Pike, Barrington, New Jersey 08007 USA has renamed their catalog (or one of them) "Scientifics," but it's still filled with a universe of gizmos and items of almost every description for science education and fun. For a copy or to order, call 1-609-547-8880 or fax 1-609-573-6295.
Another of Edmund's catalogs is their 1996 Optics and Optical Components Catalog, freshly received. It's filled with optical products and equipment of all sorts, from lenses and mirror blanks to fiber optics, lasers, and optical test equipment. The catalog is printed in both English and Japanese. To request the Japanese version of the catalog, contact Edmund Scientific Japan, Room 501 Oltensia Hakusan Building 33-16, 1-Chome, Hakusan Bunkyo-ku, Tokyo Japan 113, telephone 03-5800-4751, fax 03-5800-4733. Other catalog inquiries from outside the
When I'm stuck for new things to include in the column, a trip to the old museum gift shop to look at that latest new items is usually good for a few ideas—such as the following.

One clever item I found was the battery-operated Horizon Time Globe—a sort of little (and cheaper) three-dimensional geochron. It consists of a four inch (10 cm) wide earth globe laid out with time zones, on a gray metallic stand with a 2.5-inch (6.25 cm) square base. Around the equator protrudes a ring marked with hours in a 24-hour system, with gradations down to five-minute intervals.

Pop a standard 1.5 volt AA battery in the base (which starts the thing to ticking faintly), align the hour dial with your time zone so it tells the correct time for your location, and let it run. The device will move the hour dial in relation to the globe so that it keeps the correct time for your time zone—and of course, you can readily check the current time of any other place on the globe. I set it up and let it run for a day or so; sometimes it kept good time, sometimes it seemed to get hung up and got behind and I had to reset it. Maybe it was my particular unit.

Accompanying the little global timekeeper are instructions for use plus a list of countries with their time zone listed, and whether they adopt seasonal time changes. For our store, the device wholesaled for $22.50 U.S. (figure a 50% retail markup or thereabouts). The Horizon Time Globe was designed for Ariane and Bernard Vuarnesson for Sculptures-Jeux; our supplier is Sarut, 107 Ioratino Street, New York, New York 10014 USA, telephone 800-691-1077.

Another item I first became aware of last fall was the "Where in Space is Carmen Sandiego?" board game. It's ostensibly modeled after the popular children's TV game show called "Where in the World is Carmen Sandiego?" in which child sleuths attempt to capture arch-criminal Carmen and her henchpeople by answering questions on world geography. Here, Carmen's gone cosmic, but only in a sense: the sense that a popular icon is used to sell what's really a fairly standard board game.

The premise here is to take your turn moving your game piece around the solar system to land on planets where—if you can correctly answer a question relating to that planet—you can pick up the planet token; when you have three planet tokens and land on the "Carmen" space, you've won the game. The Carmen space, the fact that you can steal planets from each other, and a few forced mentions of the woman in questions are about the extent of any relationship to Ms. Sandiego—which is unfortunate. And there are only 20 general (mostly multiple-choice or yes/no) questions which, when applied to each planet, give you 180 possible questions altogether. (Examples: "Traveling at a speed of 100 million miles per year, how long does it take to reach this planet from the Sun?" Or "A majority of this planet's atmosphere is made up of which of the following gases?"") Or "Does this planet's name contain at least two vowels?" Or "Is this planet named after a character from Roman mythology?"

A quick once-over suggests that the astronomy used is basically sound. But once you play it a few times and know all the answers, I wonder if the game loses much of its charm. I was also left wondering what Carmen Sandiego had to do with this game—but that answer was not included.

"Where in Space is Carmen Sandiego?" wholesales for $11 U.S. for our store. Our supplier is University Games, 1140 O'Brien Drive, Menlo Park, California 94025, telephone 915-322-3953. I must say that I expected something more from the concept advertised on the box cover—recovering planets or asteroids stolen by Carmen, answering questions that help to reveal her location—something. Maybe the Carmen Sandiego planetarium show and computer game versions which I hear rumors of being in development will supply that something.

Another educational product I examined is the Nightcraft Field Kit put out by the DaMert Company, 1609 Fourth Street, Berkeley, California 94710 USA, telephone 800-217-9960. The packet includes materials for several astronomy projects plus a booklet of instructions and concepts. There are stick-up images of the sun and planets (not at correct relative size) with instructions for decorating them with phosphorescent paints (included) and sticking them on your wall at their correct relative distances from the sun. There are 17 constellation cards giving patterns and figures on one side (onto which you can stick little glow-in-the-dark dots as stars) and some mythology and how-to-find information on the back. There is a compass to help you find the cardinal directions for finding constellations outside, and some general stickers for making your own space scene.

There are some fairly good astronomy concepts offered in the activity booklet, but I think I would have provided an easier, user-friendlier way to find the constellations than...
The GSS-Helios (GSX) features 25,000 stars reproducing a sky seen only from space. Digital shutters mean panoramas without stray stars twinkling through the image. Computer-assisted functions give manual mode the ease of auto mode without replacing the lecturer. The list of special GOTO features goes on and on. Contact your nearest representative and find out what your planetarium could be like.

The G1014si offers Space Simulator functions plus GOTO’s exclusive automatic lamp replacement mechanism. No more shows lost to lamp burnout. With the G1014si, your spare lamp leaps into action with a simple touch of a button at the console. Simple, fast and efficient. That’s a GOTO Planetarium.
We were almost still huffing and puffing from loading the donkey after Grand Canyon Suite, when Bill Holland said, “Let’s do Symphonie Fantastique by Hector Berlioz.” Agreeably, I grunted, “Okay.”

“... blade or rope, rope or blade? But, what about a head and the scaffold...?” Bill mumbled as he as he walked from the planetarium. Shortly after, Bill returned to the planetarium saying, “The guillotine was proposed in 1789 and the symphony was in 1832. Let’s make it the blade, but what about the scaffold?”

Under his arm he had a brightly jacketed LP vinyl record. Eagerly, he put it on the turntable, adjusted the volume and leaned back with his eyes closed and his hands folded across his chest. I listened dutifully as he smiled through Movement I, Movement II and Movement III.

With opening measure of Movement IV, I came alive—half sputtering and half shouting, “Our Mister Sun! Our Mister Sun!” Then as calmly as I could, I explained to Bill that that was the theme music for Our Mr. Sun. It was the premiere movie of the Bell Science series that aired in April 1954. In early April, I learned of its coming and made arrangements to go to my sister’s house to see it in black and white. As the movie unfolded, I started the sputtering and shouting, “That’s it! That’s it!” Not quite as calmly, I explained to the family that the information being presented was exactly what I had been trying to get across to my general science students.

During the next fifteen years, I borrowed the film and showed it to my students and to science club members for a total of one hundred times. My zeal increased and we started planning.

Movement I. Dreams, Passions. The star projector was set to represent the star field for a summer night in 1832 at the latitude of Paris France. A very slow diurnal motion and a very slow sunrise were followed by various pastels on the dome.

Photos of the Beloved One began to appear at the zenith. One of Bill’s band students, Linda Saunders, posed wearing a beautiful gown and wig styled in a French roll style. Linda was photographed with at least two rolls of film in an Instamatic camera as wrinkle lines were added to her face. Nose putty was applied, teeth were blackened, her hair was ruffled and the burgundy gown changed to black. As the slides were projected, each successive slide was turned ninety degrees.

Movement II. A Ball. Small polystyrene figures of costumed dancers were photographed at close range and rearranged in different poses. These were scattered around the dome and cross-faded for a massive dance scene.

Movement III. Scene in the Fields. A montage of farm scenes and fields of wild flowers were used.

Movement IV. March to the Scaffold. A stick man slide was the photo representative. Placed in a carousel projector turned upside down with a slip-ring power supply, the stick man marched around the periphery of the dome as the blade appeared.

The guillotine blade was a mock-up made of masonite painted with two tones of gray and photographed with slide film. The slide was placed in Viewlex low profile, single slide, low wattage projector. Projector was mounted on a horizontal axis, counter-weighted and powered by a one rpm timing motor with a slip-ring cutoff.

The blade appeared ten degrees north of the zenith. It traveled downward during the last 14 seconds of movement IV toward the north point on the horizon. There a gloved hand, through an access hole in the peripheral projection ring, waited. At the second the blade switched off, Mike Dickerson’s gloved hand unperched the head.

At that moment the red, 7 1/2 watt bulbs lining a hog trough type chure were lit. The head was a bowling ball covered with a wig on one half and a shrouded piece of pantyhose on the other half.

As the head tumbled downward, it was guided by a chute made of weathered 1 by 6 lumber from a dismantled house. It was screwed together to make a V-shaped trough. The trough was cut into five sections.
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Hello. First of all, please note that I've changed my email address. The lure of a local call access number and the superiority of Netscape over Mosaic, made me move from CompuServe to another service provider.

As we edge towards a new century (through what people in England call the Nervous Nineties) and society's collective thoughts become increasingly global, I thought it would be a good opportunity to gauge the views of planetarians on the environmental content of some planetarium programs. The topic for this column is therefore:

To what extent, if any, should planetarium programs reflect environmental issues?

My compatriot, Undine Concannon, starts the ball rolling with a salutary tale.

In conjunction with Friends of the Earth, the London Planetarium presented a public show, Planet Earth, from 1993-94. In a half-hour show, the breakdown of the topics were as follows:

6 mins - looking at stars from London, with light pollution, and then progressively looking at stars further back in time.
1 min - discussion of Earth's atmosphere - height, composition, etc. We looked back at all the planets of the Solar System.
8 mins - atmospheres of contrasting planets, firstly Venus. Could Earth ever become like Venus? Mars may have had water once, but no life has been found.
7 mins - how the Earth evolved, from barren rock to planet with continents and oceans. Dinosaurs and asteroid impact. Changes of climate.
3 mins - astronauts views as they look back at Earth.
4 mins - satellite pictures of the beauties of Earth as well as some forms of pollution - forest fires, oil wells etc. Changes in the ozone layer; causes include traffic, industry, aerosols, and people.
1 min - the age of the Earth on a 24 hour clock, ending on a fairly optimistic question. It's not too late to stop the rot.

Reactions to this were varied, but by far the majority were unfavourable. Many complained about the use of still images - in the 4-minute section we showed a number of slides, like a collage. Here is a random selection of comments from the file.

Favourable:
These came mainly from teachers, who found it a worthwhile compliment to our Schools programme, and appreciated the "message".
"Great message - but you should do more on the population issue."
"Excellent, full of valuable information."
"Glad to see you are taking the environment seriously."
"Very interesting and informative, but shame about the shop-wide range of environmentally damaging, unessential products." (Yes, this lady was right).

Adverse comments:
"Not enough about stars."
"Not enough about planets."
"Far too much about the environment - we're sick to death of it, we can see this sort of thing on TV every day." (The "heavy" part only took up the last five minutes).
"We did not come to the planetarium to see a programme about the Earth."
"Controversial script, danger of brainwashing children with unproven theories." (Incidentally, children seemed to love it).
"Global warming may be important, but it's not what we came to hear.""
"Content terrible - totally concerned with the destruction of the Earth. Planetariums should be about the glory of the night sky."
"We all know about the environment, factories and aerosols and that's what your show mostly consisted of. You should change the name to let people know they won't be hearing about stars." (Well, we did call it Planet Earth).
"Disappointed with lecture on the effects of greenhouse gases and overpopulation. Expected more about planets and comets."

Some also objected to what they saw as heavy political overtones. In other words, they did not approve of our displaying three small posters of satellite Earth pictures for Friends of the Earth, including a FoE logo on a window display, and having FoE leaflets available for visitors.

We felt good about the show, and felt we had a responsibility to cover this subject for once. However, we have never had so many complaints about the subject matter, and will be unlikely to do it again - which is a pity, I think.

Undine Concannon
London Planetarium
Marylebone Road
London, England

I don't think we should go out of our way to push environmental issues; there are plenty of people already doing that. However, where an environmental issue crosses into the field of astronomy, then it warrants a mention.

For example, a show based on Antarctic Astronomy would be a little disappointing if it didn't refer to the unique climatic conditions and the tenuous life that survives in it.

Another example might be the associated damage done to the environment by the industrial waste that contributes to the loss of our night sky. This may arise during a discussion of light pollution & its effect on observers.

Although I wouldn't rule out producing an environment-based show, I think we are only likely to do it if we are approached by a group or organisation who are willing to pay us to produce it. Left to ourselves we will stick to the topic that led us to build the planetarium in the first place - astronomy.

Grant Nicholson
The Canberra Planetarium (under construction)
c/o The Downer Club
Hawdon Place
Dickson ACT 2602
Australia

It is my personal belief that the chief endeavor of any planetarium should be to educate its audience, be they students or the general public, in the history, practice, theories, and facts of the science of astronomy. In my opinion, all planetaria should be doing at least this much. They do not, however, have to be limited to it. Astronomy is not an isolated discipline, for certain. It affects and is affected by every discipline of physical science, and most biological disciplines. Insofar as astronomy does play some part in the biological sciences and physical "resources" of an ecological system, I do not feel that it is beyond the jurisdiction of any planetarium to present accurate and well-considered information on "environmental issues." However, I would expect such information to be presented in an astronomical context, free of conjecture, and politically neutral.

For instance, it is quite reasonable, in the course of a planetarium show, to state that, as is true, the heavy metals found and mined in the Earth's crust, and used in industry,
were created by the atmospheres and/or deaths of stars that existed before the birth of the Sun. It is further reasonable to state that these "resources" are limited and are often quite poisonous to life on the Earth's surface.

I do not think, however, that it would be reasonable for a planetarium to stress the "need to conserve" such resources any more than I would find it reasonable for such an institution to promote the "consumption" of such resources. In either case the planetarium would not be acting in a politically neutral manner.

More than this, any planetarium that would undertake such action would not be serving its highest purpose. I believe that planetaria should be concerned, first and foremost, with education. It should not be in the agenda of any planetarium to champion an ecological cause, no matter how "low-key," no matter how genuinely we may be convinced to do so, personally. In short, it's just not our bag. If those working in a planetarium feel the need to support a particular political position, be it environmental or otherwise, they should certainly be free to do so on their own time, and not in the name of any educational institution.

Jonathan Garrison
Planetarium, Junior Museum and Nature Centre of Lee County
3450 Cortiz Ave, PO Box 06023
Fort Myers
Florida 33906

Speaking as a director of a public school planetarium/multimedia theater, environmental issues are a natural part of our overall programming. Although at this time I don't offer a specific "environmental lesson", I integrate environmental issues into many different lessons.

For example, I consider light pollution an environmental issue that can be discussed (or at least mentioned) in any lesson that takes an earth-based view of the night sky. In fact, whenever I illustrate the current night sky to my students, I do so with our blue cove lights on slightly and the stars at less than full brilliance. Not only does this show a more realistic sky for my suburban students, it also affords me the opportunity to comment on why the sky doesn't appear completely dark. Of course, in most programs I include a look at the sky under ideal conditions as well.

Environmental concerns such as global warming, depletion of the ozone level, and pollution of the atmosphere come up naturally in lessons dealing with conditions on other planets. Similarly, environmental stewardship is a natural outgrowth of examining the earth as a planet. When viewed as a whole, the interdependence of the various ecosystems which make up the earth's biosphere becomes evident. In dealing with environmental issues in this manner, one can avoid sounding too preachy or heavy-handed in the presentation of these sometimes controversial subjects.

Don Knapp
The H. W. Ray Special Experience Room
McDonald Elementary School
Centennial School District
Warminster, Pennsylvania, 18974 USA

While most might think that a planetarium program is limited to stars, planets, and other celestial objects, we must always be aware that Earth is a member of our Solar System as well; and certainly can be the primary topic of a planetarium program.

I am part of Hansen Planetarium's education department and therefore work directly with school kids and teachers most of the time. I try to help them understand the importance of preserving the environment by drawing the following relationship (a well-known analogy to science educators, I'm sure).

As astronauts prepare to leave the Earth, whether they be preparing for a one week shuttle mission, a one year stay on Mir, or (in the past) a one week trip to Moon and back, they must take with everything they will need to survive. While most kids quickly recognize the needs for food, water and air to breathe, they may not really understand the importance of the atmosphere as a delicate blanket protecting us from the continual bombardment of solar energy. An astronaut has a well-designed space suit to provide protection from harmful energy, excessive heat or cold, and the potential meteoroid impact. Our atmosphere acts as a space suit for the entire Earth, not just the population but the global ecology as well.

While the planetarium theater may not be the best place to talk about the Spotted Owl, Blue Whale, or Desert Tortoise as individual species on the endangered list, it certainly is appropriate to build into a planetarium discussion about the Solar System the importance of maintaining our own space ship, planet Earth. The constant demise of the Rain Forests of Central and South America; the increase of greenhouse gases in the atmosphere and the correlation to increased industry in our society; the apparent depletion of the ozone layer and its relationship to our modern way of life; the effects of a global nuclear conflict; all these (plus many more) are definitely appropriate topics for planetarium programs. It is also appropriate to discuss natural occurrences that, though we might not be able to control, we can still study, plan and prepare to deal with. These include the effects of volcanic ash in the upper atmosphere across the globe, and the effect of a comet or large meteor crashing into the sea, the desert, or downtown megalopolis.

We explore and investigate, study and learn about worlds we cannot conceive of visiting in the near future. Why? They tell us about our own world, our own place in the cosmos, and what might happen is we exceed Earth's natural ability to sustain our growth and development.

Richard C. Cox
Hansen Planetarium
Salt Lake City, Utah, USA

My opinion on this potentially thorny issue is that the Earth is just as much an astronomical body as Jupiter, the Sun or a black hole, and so it is perfectly valid for planetarium programs to at least touch upon our planet's environment in its astronomical context. Nobody wants to be hit over the head with the well-worn issues, but important facts can be subtly highlighted in a skillfully produced general script which compares our biosphere to that of Venus or Mars, for example. For better or worse, the environment has unfortunately become entwined with politics and many people seem unable to separate the two. Astronomy is above (and much older than) politics, but there should always be a place in the planetarium for discussing in appropriate terms, however briefly, the Earth's changing habitat.

Wherever one looks in the world today, planetaria are struggling against fierce competition from other media for the public's patronage. Imminent closure is always just round the corner for many domes, and every facility has to justify its existence. In light of these difficult times, the subject for the next Forum will be:

The planetarium profession is going through its most difficult phase in 70 years of public service. Budget cutbacks and strong competition from television, video games and many other media are making life for planetarians increasingly difficult. What encouragement would you give to a young person just out of university who is considering entering the profession, but is put off by what they have heard? I'll be happy to receive your contributions by April 10.

Until next time, when you pore over the Jupiter data from Galileo, remember that in a particularly embarrassing typographical error, Nature once informed its readers that the probe cost $14!
for more information contact Gregg Gillis

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Telephone (604) 669-5525 Fax (604) 669-6347
on the coattails of the personal computer revolution of the past decade, astronomy software has burgeoned well beyond what one might reasonably expect. It seems that the most popular type of program, at least among software developers, is some form of computerized planetarium. Indeed, there are at least two dozen such programs currently available, ranging from shareware to packages costing over $200 (U.S.). Most of these desktop planetariums share a common focus on simulating the night sky, usually from a geocentric perspective and usually with an emphasis on stars, constellations, and deep sky objects. Often the sun, moon, planets, and a few other solar system objects are included in these programs, but they usually take a back seat to the deep sky database. A notable exception is Dance of the Planets.

Dance of the Planets provides graphical dynamic gravitational simulations of solar system bodies during the period from 4,680 BC. to AD. 10,000. In addition to the sun, moon, and planets Dance includes known planetary satellites and over 7,500 asteroids and comets. New comets, asteroids, or hypothetical objects can be added to the database.

Dance simulations can be viewed from three main viewpoints: any location on the earth, from a near earth space viewpoint, and 270 AU from the sun. Various zoom settings permit displays from a wide 180 degrees to 32,000X, in some cases. Under suitable magnifications the planets display rotating disks. The passage of time in Dance simulations is set by a quantity Dance calls "Pace". It ranges from real time to, in some cases, plus or minus 240k. Negative pace values indicate backwards movement in time.

Although Dance's strength is its solar system simulations it does boast a stellar database of 9,200 stars to magnitude 6.5 and over 1,300 deep sky objects including nebulae, star clusters, pulsars, galaxies, quasars, radio and x-ray sources. Optional extensions add stars to 8th magnitude (52,000 stars) or 10th magnitude (380,000 stars). Both I.A.U. constellation boundaries and stick figures can be displayed with Dance.

Known objects can easily be located with Dance's "Find" function. Unknown objects can be selected and identified using a mouse directed cursor or with a "Label" function. The cursor identification has the added feature of opening an object information box that displays additional information from the database and, when viewing from the earth, rising and setting times. Unfortunately the "Label" function causes any time progression to pause while the labels are displayed. If you resume the progression of time, the labels switch off.

Dance's features, accuracy, and flexibility combine to make a superb reference tool and time machine for our solar system. Historians can use it to identify, confirm, and recreate important planetary alignments of the past. Planetarians, science writers, and others can use it to survey future astronomical highlights long before annual almanacs and ephemerides are published. What's more, no longer must you wait for the astronomical magazines to show you the path among the stars of a newly discovered comet. Indeed, I found it relatively easy to add the orbital elements for Comet Hale-Bopp and to plot its path for the next year. Perhaps the most stunning simulations, however, were those of lunar occultations.
and lunar eclipses.

In addition to Dance's wonderful simulations, it will also calculate and print out reports of such things as rise, set, and transit times and coordinates of the sun, moon, planets, and named stars at a given location. It will also tabulate the circumstances of major meteor showers for a given year. Of even greater interest is Dance's search capability that allows you seek out eclipses, occultations, transits, and conjunctions over any span of time. In addition to the circumstances of these events, Dance also calculates a table of the ground track where appropriate. Sadly, Dance does not plot these tracks on an earth map for you.

Unfortunatley, Dance of the Planets is still only available in a DOS version. Although it provides VGA level graphics, its interface is somewhat crude by today's common Windows standards. A two-line function bar at the bottom of the screen and pop-up menus serve as controls for the program. These menus are
fairly intuitive and not too intrusive. The DOS format of Dance is no doubt responsible for the fact that it only takes up 2.9 megabytes of hard disk space in its minimum configuration, and only 7.4 megabytes with the 10th magnitude stellar database. Even though Dance requires VGA graphics, it will operate with a 286 CPU without a math co-processor. Without one, however, as you can imagine, performance speed can slow to almost glacial. Thus ARC recommends DOS 5.0, or later, a math co-processor, and 538K or more of available lower memory. Installation of the program is quick and straightforward.

Dance of the Planets comes with an extensive printed manual and built-in help function. The program is relatively bug-free. It's a good thing because ARC doesn't offer a technical support phone number (800 or otherwise) or even an e-mail address for questions. Dance does come with a 30 day money back guarantee of satisfaction. Also, ARC allows images photographed or printed from the screen to be used in non-profit publications such as newsletters.

The only major problem I had with Dance was in printing out the displays. Although ARC boasts that, "All printers, all ports, conveniently supported and selected" with Dance of the Planets, I still haven't gotten it to print out in anything other than 'screen dump' mode with my Canon BJC-4100 printer. The Dance printer set-up option allows for just seven printers: HP LaserJet, HP Paintjet, Epson 9 pin, Epson 24 pin, IBM Pro x24, IBM Quiet, and Postscript. If you don't have one of those printers, ARC suggests that your printer will emulate one of them. Unfortunately this is not always the case. When I did get it to print to an Epson 5000 24-pin dot matrix, the print command not only produced a nice hard copy, but it also distorted the graphics displayed on the monitor and hung the program.

Not withstanding the print driver shortcomings and lack of technical support, Dance of the Planets is the best solar system simulator I've seen so far. It's flexible, accurate, memory efficient, and offers endless possibilities of exploration for anyone interested in the intricate choreography of the solar system.
Nominations for Fellows of the International Planetarium Society

If you know of an IPS member who qualifies to be a Fellow, please nominate her/him by writing to:

Phyllis Pitluga
Award's Chairperson
The Adler Planetarium
1300 South Lake Shore Drive
Chicago, Illinois 60605, USA
ppitluga@midway.uchicago.edu

The qualifications are:

1. Continuous active membership in good standing in the Society for at least ten years
   or
2. Continuous active membership in good standing in the Society for at least five years, and substantial contributions in at least two of the following respects (a-d):
   a. serving IPS in an elective office, diligent and devoted committee work, and the organization of conference meetings.
   b. relevant and significant publications, and/or conference presentations
   c. cooperation with professional societies, organizations and groups which bring attention to the importance of planetariums' existence
   d. the development of new methods and media in planetarium presentations.

International Planetarium Society
(Through 1994 Meeting)

Fellows
Abraham, James H.
Adams, Kenneth
Allen, Robert
Baber, Barbara
Back, Mariana
Baker, Lonny
Bishop, Jeanne E.
Bingham, Terry
Bromley, Lars
Broman, Per
Buchalter, Terry
Calvird, H. Rich (R)
Campbell, Paul B.
Carlson, Gary A.
Carr, Claire
Carr, Everett Q. (D)
Chamberlain, Joseph M. (R)
Chamberlain, Von Del
Chronister, William
Clarke, Thomas
Concannon, Undine
Connors, Peter
Cotton, John
Davis, Darryl
DeVore, Edna
Dietrich, Bruce L.
Doyie, Robert J.
Dumas, Jacques A.
Dunne, David A.
Dunn, Jack A.
Elvert, Jon
Engle, Paul R. (D)
Etheridge, Dale
Fairman, Rita
Feldman, Charles
Friedman, Alan J.
Friedman, Francis
Gielow, Arthur
Grice, Noreen
Goering, Keith
Gonzales, Val
Groce, Philip R.
Gutsch, William
Hagar, Charles F.
Hall, Donald S. (R)
Hamilton, George (R)
Harber, Hubert
Hare, John
Hart, James
Hastings, Jane Geohegan
Hemmans, Charles
Henning, Lee Ann
Horn, James
Hicks, John
Hocking, Thomas
Hoffman, David (R)
Holmes, Charles
Hooks, James A.
Hutton, Michael
Jackson, Francine
Jameson, Edward
Johnson, Keith
King, Henry C. (R)
Kinsella, William
Knapp, Donald
Knapp, Richard
Knappenberger, Paul
Koonce, Eloise
Lazader, William
Levine, Mark J.
Lieb, H. Stephen
Lowry, William H.
Mallon, Gerald L. (D)
Marché, Jordan D., II
McGregor, Ian
Melenbrink, Eric
Menke, David
Mitch, Steven
Mosley, John E.
Munóz, Gabriel
Murtagh, Terence
Olivero, Jose
Pabon, Tony
Panek, Jeri
Pasachoff, Jay
Pedas, Ted
Peery, Richard A.
Peters, William T.
Petersen, Carolyn Collins
Petersen, Mark C.
Peterson, John
Pettersen, Franck
Pierce, Donna
Pitluga, Phyllis
Pogue, John A.
Purinton, Gary
Ratcliffe, Martin
Reed, George
Reede, Roger J.
Reilly, Robert
Russo, Steven
Ryan, Michael
Savage, Steven
Schafer, Sheldon
Seltzer, Allen
Serrie, John
Sharrah, Paul C.
Schmidt, Mickey
Shuey, Ronald
Simopoulos, Dennis P.
Smith, Charles
Smith, Daniel D.
Smith, Jeffrey
Snow, Bryan
Sonntag, Mark
Sperling, Norman
Starr, Eileen
Stec, Thomas
Storch, Samuel
Stutz, Fred
Summers, Carolyn
Takens, Charles
Tenscher, Walter (R)
Tomlinson, Gary
Toy, Larry
Tuttle, Donald E.
Trovovich, Sheri
Van Schaik, Harold
Vinski, Jerome
Wasiluk, Elizabeth
Webster, Dennis
Wharton, John
Whitt, April
Wieser, Sig
Williams, John
Wilson, Kenneth
Winslow, Thomas
Wyrick, Wayne
Young, Warren
Zimmermann, R. Erik

Service Awards
Walter Bausfeld, 1988
Jeanne Bishop, 1990
Von Del Chamberlain, 1992
Alan Friedman, 1990
Ronald Hartmann, 1984
Mark Littman, 1982
Ian McLennan, 1982
John Mosley, 1994
Armand Spitz Jr., 1988
Walter Tenscheirt, 1986

(R) retired
(D) deceased
Focus on Education

Looking at Earth from Space: Remote Sensing of the Home Planet in the Planetarium Setting

Stu Chapman
Harford County Public Schools
Southampton Planetarium
Moores Mill Rd.
Bel Air, Maryland 21014

Because our planetarium program was conceived in the late sixties, it had focused primarily on observing the sun, moon, stars, and planets as seen from Earth—a true geocentric perspective. In the last several years, however, it has become possible to obtain direct readout of data in real time from meteorological orbiting satellites using a computer and only modest (and fairly inexpensive) equipment. After adding the capability of direct readout to our planetarium program, we were able to expand our lesson offerings by encouraging our attending teachers to select from a variety of "meteorology" lessons as well as the traditional lessons that we had always offered in astronomy. In this way, students could visit the planetarium to observe the celestial bodies in the sky from Earth or they could observe the Earth as a dynamically changing planet itself from space! By this we do not mean seeing those beautiful blue and white Apollo photographs masked in a starry background in a "theatrical" sense, but actually observing the earth from space just as real scientists do! In this issue, I will describe some of the background of direct readout, explain where you can find information for considering its use for your planetarium program, and highlight a simple qualitative-based lesson we have developed for secondary students using this added technology.

Direct readout is the capability to acquire information directly from meteorological satellites by setting up a personal computer based ground station which receives the satellite signals. The electronic signals are then displayed as images on the computer screen and projected onto our dome with a LCD projector. These raw-data images can be utilized immediately in the instructional setting or saved onto floppies and provided to the attending teacher who in turn can make copies for the students for processing and follow-up analysis in the science laboratory after the planetarium session. A basic ground station, excluding the computer itself, can be obtained and set up in your facility for less than one thousand dollars! After the initial start up cost, an unlimited supply of data can be obtained without additional cost.

The basic ground station described above involves obtaining direct readout from the NOAA and Meteor (Russian) polar orbiting satellites as they pass within the receiving range of a ground station. The polar orbiting satellites are in a sun-synchronous orbit (from 810 - 1100 kilometers above Earth) and thus provide data twice daily around the same local time (once in an ascending orbit and the other in a descending orbit about twelve hours later). In this way data is provided with a consistent frame of reference. Polar orbiters transmit data in the 137 - 138 MHz range and their signals can be obtained with a basic turnstile type or quadriifil antenna. The satellites transmit both high and low resolution data. We are able to receive the low resolution data, called Automatic Picture Transmission (APT) which has a resolution of about 4 square kilometers per pixel. Our turnstile antenna contains a preamplifier and is mounted on the roof of Southampton Middle School right above the planetarium area. The length of the coaxial cable from the antenna to our receiver, installed on a "card" into our PC, is less than 30 meters. There are a number of vendors who supply both the hardware and software needed for a basic APT style ground station.

For an additional startup cost of another thousand dollars or so a ground station can also receive transmissions from the Geostationary (GOES) satellites. From their geostationary orbits of greater than 35,000 kilometers above the Earth, entire disk Earth images can be received. This type of reception requires a satellite dish oriented in the direction of the satellite which has a constant altitude and azimuth with respect to the observer. Transmission from the GOES satellites is in the 1691 MHz range. In addition to the satellite dish, a downconverter is needed to convert the data to the 137-138 MHz range. The GOES satellites transmit processed images called WEFAX. However, these same images are widely available on the world wide web, and since they are already processed, they do not offer the same opportunities for science teaching as those of the basic raw-data APT transmissions of the polar orbiters.

APT images display gradients of the Earth's topography and temperature, cloud formations, the flow and direction of winds and water currents, the formation and life cycles of mid latitude cyclonic systems and hurricanes, and a view of the Earth's geography. Infrared and visible images are transmitted simultaneously during daylight and a near and far infrared transmission occurs during darkness. On the "visible" images one can readily see the moon's umbral position at times of a total eclipse! The infrared images, probably more useful from a meteorological standpoint, readily show the locations of thunderstorm clouds and other major weather systems. In addition, most of the software allows the end user to obtain the temperature of any pixel, and this allows one to monitor sea surface temperatures quantitatively on days when there is no cloud cover and to observe the coldest cloud tops which usually contain most of the precipitation. As this column is being written in early January, a major snow event can be seen approaching the Maryland area from the south via our ground station, and we have had numerous students and teachers in and out of our planetarium in between classes and after school to "see the latest" developments themselves!

Direct readout provides students with a unique opportunity of acquire data firsthand from satellites. School or university based planetarium programs that provide access to this technology enable their students to participate in a hands-on science process, fostering the development of the scientific habits of mind of collecting, processing and analyzing data and making predictions. These are the types of activities and levels of instruction that are being encouraged in all of the major science education reform initiatives and measured in statewide assessment programs. Following is a simple qualitative analysis involving infrared and visible imagery that we have developed to augment our Colors And Space offering from Volume 4 of the PASS series.

In our planetarium, we utilize almost all of the various PASS volumes in one way or another in our lesson offerings. PASS is an acronym for Planetarium Activities for Student Success. There are several PASS volumes, some of which are complete planetarium programs. The one thing that they have in common that makes them valuable teaching tools is that they include a great deal of attending teacher and student participation in the delivery of the lesson itself and they provide excellent ideas and strategies for expanding on the topics included to meet an institution's individual needs. Volume 7, entitled Colors and Space, involves, among other things, an introduction to the various parts of the spectrum ("colors") that can't be
infrared pair of

within range of our station during a

springboard for discussion on observing in

Encourage the students to observe the

images of the same area at the same time and

In the classroom later.

We captured a NOAA 14 ascending pass here

cloud deck of cirrus or cirrostratus and looks

gray on an IR image.

An international symposium on the history of sundials’ science will be held during the XXth International Congress of the History of Science (Liège, France, 20-26 July, 1997).

Researchers who would like to attend the symposium should register near the Congress. Those who would like to read a communication are invited to supply an abstract to the referees members of the Program Committee.

Please contact and send your abstract before May 1996 to:

Dr. Jean-Michel Faidit
Université Montpellier III
Planétarium
B.P. 1088 - 34007 Montpellier
France

Notice

History of Sundials

An international symposium on the history of sundials’ science will be held during the XXth International Congress of the History of Science (Liège, France, 20-26 July, 1997).

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France

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Planetarian

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Each cooperative group will be given two images received from the planetarium ground station. Although each looks somewhat different from the other, they are actually two images of the same place at the same real time. Complete the activities and answer the questions below:

1. From which satellite were the images received and at what local clock times?

2. What is the primary difference between Channels 2 and 4?

3. Locate at least one parallel of latitude and three meridians of longitude on each image. Use an atlas to label each. Don’t forget (N, E, S, or W) after each.

4. Assuming there are four persons per group: Divide your Channel 2 and Channel 4 images up into quadrants. On a separate sheet of paper, each person should list as many differences as possible between the two images. This requires careful observation, and could take some time.

5. Locate object “L” on the visible image. Use an atlas to name object “L” below. Generally, how do bodies of water differ from bodies of land on the visible images? (hint: compare Lake Huron and the Atlantic Ocean to land masses nearby.

6. Locate river “R” on the infrared image. Use an atlas to name river “R” and explain why it appears “darker” in color than the surrounding land.

7. Locate object “L” on the infrared image. How might it appear different on infrared images obtained in February or March? Explain your answer.

8. Use your atlas to locate the Canadian province of Nova Scotia. How does the cloud cover over Nova Scotia appear different in the infrared and in the visible images? What information does that provide about the altitude of the cloud deck over Nova Scotia?

9. The symbol Cs stands for “cirrostratus”. Cloud heights are generally described as high, medium, or low. Compositions are water, ice, or a combination of both water and ice. Based on the information available from your images, what would you estimate as the altitude and composition of cirrostratus clouds?

10. Locate area “Sx” in the northern midwest on both images and compare the color around “Sx” on both images. How do you explain the differences in color around “Sx” on both images?

11. Is the area around “Sx” a low cloud deck or something else? If so, what?

12. Locate the “stipples” near area “X” on both images.

Would you classify the stipples as high, medium, or low altitudes?

How can you explain the appearance of the “stipples”?
Lars Broman
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Ostra Hamngatan 1
-791 71 Falun, Sweden
Phone 46 2310 177
Fax 46 2310 137
lars.broman@planetarium.se

The important Planetarian column Regional Roundup is now in new hands, and I will take the opportunity to thank my pre­decessor Steven Mitch for his many years of excellent work. I will try hard to keep the standard high, Steve.

The continued success of the column depends entirely on contributions that I receive from IPS Affiliate Associations all over the world. Please continue to contribute as you have done before. In order to be sure that your text will make it into the column, please make sure that I have it at the first day of the Planetarian deadline month. The deadline for contributions to the March issue is thus 1 April.

Thanks to Ignacio Castro, Undine Con­ cannon, Lori Ramponi, Shoichi Ito, Fred Stutz, Jon Elvert, Mickey Schmidt, and Zaida Sitkova for contributing to the first 1996 Regional Roundup Column. You are wel­come back with new reports, and I look for­ward to reports from other Associations as well. Please remember that a short note is also appreciated!

Association of Mexican Planetaria­ums
The XXV AMPAC meeting was held at Planetario de Puebla, Puebla, from 24 to 26 January. Among other topics dealt with there was the possibility that Morelia Planetarium will be chosen by the IPS Council as the site for the year 2000 IPS Conference! A very interesting and supportive job, which will hopefully be backed by all AMPAC members.

Centro Cultural Alfa in Monterrey, N. L. closed for three weeks during January to remodel some of its exhibits, their aviary. Also its 23 meter tilted dome screen received a new powder-coated set of panels to replace its existing dome skin after 18 years of opera­tion. The job was done under the direction of Spitz Inc. supervisors.

The Luis E. Erro Planetarium in Mexico City has been preparing their Sun Festival to take place on 21 March.

British Association of Planetaria­ums
There is a new Astronomy and Space Science Centre in the UK, at Sheffield Hallam University. It has a portable planetarium and will act as a general information and re­source center, with public observing sessions, newsletters and annual conventions, as well as coordinating school research projects. Public response has so far been good, despite some cloudy weather for the Astro-Take­Aways.

Italian Planetaria’s Friends Asso­ciation
“Day of Planetaria” will be on 24 March 1996. The day has been organized in Italy since 1990, in France since 1994, and in the Czech Republic, Poland, Russia, Slovakia, and Ukraine since 1995. Also Genk Planetarium in Belgium collaborates in this initiative.

The aim of the initiative is to promote the knowledge and the diffusion of planetaria. During this day, planetaria organize lessons, shows, exhibitions, and practical sky viewing. During the day the entrance is free in some planetaria. For the occasion, exchanges and twinnings between planetaria of Eastern and Western European countries are promoted.

The annual Day of Planetaria always takes place on the Sunday before or after the spring equinox. It is hoped that in the future also other countries will collaborate in this initiative. For this reason, the Association invites other planetaria to collaborate in the event of 1996.

The initiative provides a good chance to diffuse knowledge of planetaria to the large public. The simultaneity in various cities draws mass media attention to the event. Information is looked for about planetarium recurrences in the years 1997-2001 (in particular 30th and 50th anniversaries of planetarium building openings).

There is a contest going on for the Logo of the Day of Planetaria. Please send drawings before 15 October 1995 to Italian Planetaria’s Friends Association. Contest rules will be sent from the Association (address on page 4) on request.

Also in the planning is “A week in Italy for an American planetarian” with lessons in American for secondary school students under a Starlab dome, organized by Serafina Zani Astronomical Observatory in collabora­tion with Learning Technologies, Inc. For information contact Susan Reynolds (see the Mobile News Network column for her address).

The XI National Meeting of Italian Planetaria will take place in Bologna on 6 October 1996. Local organizer is Prof. Angela Turricchia, Aula Didattica Planetario.

Japanese Planetarium Society
The annual conference of the Japan Planetarium Society was held at Makuhari Messe, Chiba on 23-25 May 1995, hosted by the Chiba Local Museum.

New officers elected for 1995-97 are Eiji Higaki, President; Kazutaka Kato; Secretary; Hiroyoshi Yoshimura, Treasurer; Membership Chairman; Masako Kitahara, Education Committee Chairperson; Tsune­yoshi Fujii, Chairman of Publication Committee; and Shoichi Itoh, IPS affiliate Rep­resentative.

Jim Manning and Bill Gutsch, the President and former President of IPS, joined the JPS conference as guests and both gave speeches. Another guest speaker was Megumu Hara, a professor at Aoyama­gakuin University at Tokyo, who spoke about “Cul­tural History of Constellations”. Eleven papers were presented at the paper session.

At the poster session, the draft form of the new directory, which will be published by next summer, was made available, and all the delegates checked their data.

On the afternoon of the last day, delegates visited Rikei Corporation to watch a demon­stration of the ESIG2000 image generator system, produced by Evans and Sutherland.

The next annual JPS meeting will be held concurrently with the biennial IPS confer­ence in Osaka, July 1996.

Middle Atlantic Planetarium Society
The Middle Atlantic Planetarium Society will hold its 1996 annual conference at the newly renovated Boston Museum of Science’s Hayden Planetarium and the Sonnesta Hotel. Our hosts will be Larry Schindler and the Hayden Staff. The confer­ence opens with registration Wednesday afternoon 8 May and winds up Saturday afternoon 11 May. For additional information, contact Larry Schindler at: Charles Hayden Planetarium, Boston Museum of Science, Science Park; Boston, MA 02114, phone 1 617 589 0278, fax 1 617 289 0454.

Nordic Planetarium Association
The Nordic Planetarium Association’s 12th Annual Conference was held at the Norwegian Museum of Science and Technology in Oslo, 6-8 Oct. 1995. Host and Conference Chair was Dag H. Kjeldahl. On the evening of Friday 6 October, an optional
pre-conference tour to the solar observatory, which is operated by Oslo University, was arranged. Ole Peder Sveen hosted the tour.

The official program started the next day with three interesting lectures. First Franck Pettersen from Tromsø, Norway reported on the results from a Master's degree thesis on informal learning, Teaching in Science Center and Planetarium. Pettersen's conclusions were that watching a planetarium show can only be part of teaching an astronomical subject, and that hands-on experience creates the necessary interest for learning.

Then Prof. Per Barth Lilje from Astrophysics Institute, University of Oslo, presented new results on the age of the universe. There is a discrepancy between recent results based on measurements of distances to galaxies in the Virgo cluster of galaxies and the measured age of globular clusters, the age of the universe seemingly being lower than that of globular clusters. The conclusion is that maybe there will be a cosmological scientific crisis in a few years. The solution might be that Einstein's cosmological constant has to be revived, in some form or another.

In a third lecture, Prof. Alg Egeland from Department of Physics, University of Oslo, presented the Norwegian space research program, including activities at Andoya Rocket Range and Svalbard Satellite Station. Among interesting things he told in his presentation was that with a 4-stage rocket, altitudes of 2000 km can now be reached—far further out than e.g. space shuttles go—and that a mini-University presently is in operation at Svalbard.

Saturday evening was banquet evening with a dinner in the most fantastic setting, in the middle of historical artifacts on the second floor of the Norwegian Museum of Science and Technology.

Sunday started with the Nordic Planetarium Association Business Meeting with Lars Broman as chair and Mariana Back as secretary. Broman reported on last year's NPA activities: NPA Meeting in Aarhus, Denmark 13-16 October 1994, a new board elected, two issues of NPNews published, a new membership list produced, and secretariat activities. Back reported about NPA finances that they are in good shape, NPA assets being over SEK 10,000. After some discussion, it was nevertheless decided to keep the membership fees for 1996 same as for 1995 (i.e. approx. SEK 100 for individual membership and SEK 50 per meter dome diameter for institutional membership). NPA was invited to hold its 13th Conference in Tromsø 19-20 October 1996 (Reidun Lunndal, host and conference chair), and its 14th Conference in Göteborg, Sweden 22-24 August 1997 (Per Broman, host and conference chair); both invitations were gratefully accepted. The meeting was followed by a paper session with eight reports:

Arvo Kuusela reported from the First Visiting Planetarium in Finland, in Saarjavi. The planetarium is very active with 25,000 visiting school children per year and twelve different programs for different ages.

Per Broman reported from Broman Planetarium, Göteborg. The company now has three Starlabs (including the projector in Stella Nova). It participated in the large science education conference and fair NOT 2000 in Stockholm 8-11 August 1995. Broman's book Mathematics with Graphical Calculator has been published in English.

Tom Callen reported from Cosmonova, Stockholm, Sweden. Cosmonova has had two million visitors during the three years of operation. New director (after retired Kjell Engstrom) is ex-would-be astronaut trainee Staffan Forsell. Cosmorama shows Omnimax movies and has a multi-media program on Bruno, Galilei, Darwin, and Einstein in production. Cosmonova is now on WWW (http://www.nrm.se/om) and Callen has made a Web page for NPA, http://www.nrm.se/om/tc-npa.html. (Great news!)

Reidun Lunndal reported from Northern Lights Planetarium, Tromsø. The bank that owned the planetarium has sold it to the State Building Co. There were 30,000 visitors January-September 1995, which is very successful. The planetarium hosts also other events than astronomy shows. A multi-media program on the city of Tromsø, Paris of the North, is being produced with Franck Pettersen (who is no longer an employee of the planetarium) as producer.

Lars Broman reported from Stella Nova Planetarium, Falun Science Center, that they have rented a new house, Ordenshuset, in the very heart of Falun, Sweden. The last show in the old place will be on 6 November and the very first in the new place 10 February 1996. Broman also reported on the 5-credit course "Popular science with emphasis on the didactics of Science centers", which he conducts at Dalarna University College. It runs this fall for the first time with twelve students, and will be followed by an extension 5-credit course during the spring of 1996. Next year's course is scheduled for 8-9 June, 12-16 August, 14-15 September, 26-27 October, and 7-8 December. Applications are invited before 8 May 1996.

Dag Kjeldahl reported from activities of Teknoteket. They have begun a successful program called Science Circus, with twenty-five hands-on exhibits set up in shopping centers—once even with a Starlab placed outside a McDonalds (at Norway's largest shopping center, in Kristiansand).

Ole Knudsen reported from activities at Steno-museet, Aarhus. They had 43,000 visitors during the first year of operation. "Moon Wedding Song" is shown every full moon evening, and "Autumn Stars" has just had its premiere. Tycho Brahe becomes 450 years old on 14 December 1996; a planetarium show on Brahe is in the planning and Knudsen invites collaborators.

Mariana Back reported from Kosmorama Space Theater, The Futures' Museum, Borlänge, Sweden and Teknorama, Swedish Museum of Technology, Stockholm. Hans Lundstrom is now curator of Kosmorama, which has increased its attendance since the Futures' Museum introduced an entrance fee to the museum (previously only the planetarium required a fee). Gaspra is a new fictional planetarium program. Back is curator of the Science Center Teknorama, where she has a 2.5 m dia "planetarium" (created by Charlotte Hilde'n) and plans to create a full screen planetarium. They have produced a drama on four female astronomers which will be shown both in Stockholm and in London.

After the paper session and lunch, one group of delegates toured the Museum and the others attended a show in the Saint-Exupe'ry Planetarium. It is a small planetarium with tilted 5 m dome, a Starlab projector, and (rather hard) seats for 35. We were treated with a lively and by the audience much enjoyed live presentation of the southern sky stars and constellations.

Finally, Franck Pettersen conducted a workshop, "Hands-on in the Planetarium", during which we played with prototype experimental equipment. So, on behalf of the about twenty delegates, Lars Broman thanked Dag Kjeldahl for a very well organized NPA Conference, after which some of the delegates were brought on a sightseeing tour to the Viking Ships Museum and to the Kon Tiki Museum.

Pacific Planetarium Association

As of January 1996, Gail Chaid, Independence H. S. Planetarium, San Jose, California, was elected PPA President. John Young, Reuben H. Fleet Planetarium, San Diego, California was elected Secretary/Treasurer. Jon Elvert, past president, is the current IPS representative. The 1996 PPA fall conference and meeting will be hosted by the Fleischmann Planetarium in Reno, Nevada in October.

The 1995 PPA fall conference was held jointly with the California Science Teachers Association Conference, which gave both PPA members and teachers an opportunity to attend many paper sessions, exhibits and workshops. It was a good mix: science
teachers received information on astronomy, hands-on activities, and the use of the planetarium as a resource. Future joint conference meetings are being planned.

Rocky Mountain Planetarium Association

This year the Rocky Mountain Planetarium Association began a tradition of making presentations to members and other persons within the Rocky Mountain Region who have contributed greatly to the field of planetarium education and/or entertainment. This honor may be earned by example, works or philanthropy. These presentations were in the form of bronze plaques mounted on wood unless requested otherwise; i.e. Charles C. Gates Foundation asked that nothing of value be presented to them during their recognition.

The Zenith Award is our highest honor. The Rocky Mountain Planetarium Association is composed of professional staff members of planetariums and affiliated organizations of the seven state region of the Rocky Mountain West (Montana, Wyoming, Idaho, Utah, Colorado, New Mexico, and West Texas). This organization represents educators, engineers, musicians, artists, lecturers, and others who support space and astronomy education and programming within the setting of a planetarium. The Association presented The Zenith Award to the late Noble Gantvoort, Robert Risch, James Vickery, and Rod Robinder.

In astronomy "zenith" signifies the highest possible attainment. It is given to those members of the planetarium community who maintained standards higher than their peers and have inspired others to follow their example. The recipients are members who are professionals, they are innovators, mentors, and teachers who inspire others to follow in striving for excellence.

The RMPA Zenith Award was presented to Noble Gantvoort in appreciation for his dedication as a professional planetarian. He was instrumental in establishing the Harry Zachies Observatory/Planetarium and co-founder of RMPA, he developed a Planetarium Intern Program at Adams State College, and he was responsible for increasing the numbers and the talents of others in the planetarium career field.

The presentation statement for Noble Gantvoort was as follows: "The first Zenith Award goes to Noble Gantvoort, the first director of the Harry W. Zachies Planetarium. Noble was one of the founders of the Rocky Mountain Planetarium Association and served as its President. Through the programs he instituted at Adams State College he made it possible for scores of aspiring planetarians to learn the skills of planetarium operations, script writing, slide production, photographic skills, and presentation. He also included astronomical observation as part of the curriculum. He was known for his positive attitude and encouragement of young men and women who studied under him. His civic concerns led him to teach mathematics and astronomy at the State Correctional Facility at Canon City. He helped establish extension courses in astronomy for teacher recertification at the Planetarium in Lamar, Colorado and at Jefferson County Planetarium. His professionalism, his wisdom, and friendship were an inspiration to all who knew him. His service reflected great credit upon Adams State College and on the Harry Zachies Planetarium and Observatory as well as the Rocky Mountain Planetarium Association."

The Award was accepted by Dr. Randy Emmons of Adams State College on behalf of Noble Gantvoort and his family.

The RMPA Zenith Award presented to Robert E. Risch in appreciation for his dedication as a professional planetarian. He is Director of the Robert H. Johnson Planetarium, co-founder of RMPA, consultant on School Planetarium Installations throughout the USA, and has given inspiration to more than one million children of the Space Age.

The Zenith Award was presented to James Vickery in appreciation for his dedication as a professional planetarian. He is Director of the Robert H. Johnson Planetarium, co-founder of RMPA and inventor of extraordinary of planetarium effects. He has given inspiration to more than one million children of the Space Age.

The Zenith Award was presented to Rod Robinder in appreciation for his dedication as a professional planetarian. He has served as Science Coordinator for Natrona County Wyoming and is co-founder of RMPA. He has served the needs of more than 170,000 Wyoming children.

The Founder's Award is an award given for meritorious service in any field related to professional planetarium support, production, writing, etc. The use of the word "founder" is meant to convey these connotations: Producer, craftsman, author, originator, initiator, builder, architect, planner, executor, or artist, but the meaning most fitting for our purposes is "Prime-Mover". Every member could qualify for this award based on the work done, if the results of their efforts have been truly significant, if your name has been nominated for consideration by members of RMPA, and after review your deeds or accomplishments are considered worthy of this prestigious award.

We have all thought, at one time or another, "if I only had the means or the persuasive ability, I would change the world", or at least some aspect of it. RMPA has chosen to recognize the accomplishments of three individuals, who through their genius and those unique characteristics, to become initiators and shapers, yes, even Prime-Movers. The direction these men chose to provide us with the opportunity to shape, mold, and guide countless millions of children and adults in ways to view and appreciate science and the heavens. These men did not come seeking this honor, in fact some were most reluctant to be made a center of attention. Their accomplishments provide the people of the Rocky Mountain Region with institutions of learning, entertainment, inspiration and imagination. Because of their actions, their vision, these members of the RMPA are dedicated professionals called Planetarians.

The RMPA Founders Award was presented to Wallace F. Fiske in appreciation of his efforts in the establishment of the Robert H. Johnson Planetarium at the University of Colorado, which has added to the educational foundation of the Rocky Mountain Region, from which the members of the association are able to affect and influence the lives of millions of its citizens.

The RMPA Founders Award was presented to Harry W. Zachies in appreciation of his efforts in the establishment of the Harry W. Zachies Planetarium at Adams State College, which has added to the educational foundation of the Rocky Mountain Region, from which the members of the association are able to affect and influence the lives of millions of its citizens.

The presentation statement for Harry W. Zachies was as follows: "In the San Luis Valley, in Alamosa, Colorado, there is another fine institution, the Harry W. Zachies Planetarium and Observatory. It is located on the campus of Adams State College. It is prominently located on that campus indicating the pride the community and college administration had for it. Harry W. Zachies, a community leader, saw an opportunity to be a "prime-Mover", an initiator and executor as he galvanized public and private support to build the facility that today bears his name. Adams State College through the Harry Zachies Planetarium was the first col-
lege in the state of Colorado to grant college credit to aspiring planetarians. While the numbers who attended that institution may be small the project that Harry W. Zachies guided, has today reached and affected the lives of hundreds of thousands of children. A few planetarians in this room can look to the Harry Zachies Planetarium as a kind of Alma Mater. Will Dr. Randall Emmons please come forward and accept this token of our appreciation for Harry W. Zachies."

Russian Planetarium Association

The Russian Planetarium Association was organized in late 1994 and incorporates twenty-five of the thirty planetariums now alive in Russia. Currently, an International Conference of Creative Employees of Planetariums is being organized under the auspices of RPA. Despite severe reduction in funding, literature and educational materials supply, planetariums in the Russian Federation still have much activity and staffs of enthusiasts. We saw some of them last spring in Nizhny Novgorod, Russia, during a similar meeting (that time held in Russian only). The Conference '96 is planned to be held in Moscow from 27 February 27 to 1 March. One of three days will be devoted to a visit of the Star City near Moscow where the cosmonauts' training center is situated. This year we expect to meet more colleagues from Russia and guests from outside the Russian Federation: Ukraine, Belarus, Lithuania, Poland, and the Czech Republic. We even hope to see (at least some of) the past and present presidents of IPS.

Last year RPA published two issues of *RPA Messenger* in which were presented current activities of the Association, as well as overview news from planetariums and from the Universe. Owing to the courtesy of Bill Gutsch, we have published an extended story about his "road to the stars". No doubt, it would be extremely interesting for the Russian audience to know more about people working in planetariums all over the world. RPA chair Zinaida Sitkova encourages those who read this message to think over the essay "My road to the stars". Another topic which sounds very interesting to RPA is "What is a planetarium?". Sitkova (address on page 4) would greatly appreciate receiving anything of the kind.

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The V. M. Slipher Committee

of the National Academy of Sciences

Announces Funds Available in 1996 for the Improvement of Public Education in Astronomy

During 1996-97 the V. M. Slipher Committee will have a modest amount of funds ($4,500) to award for projects that enhance the public's understanding of astronomy. Preferences will be given to projects:

1. requiring seed money for programs that will continue beyond the funding period

2. providing programs/service to more than a single group.

The committee does not wish to limit the amount requested, but proposals for more than $1,000 will need to be especially deserving to receive full funding. Past grants have included support for radio programs on astronomy, refurbishment of an historical telescope for use in a public observatory, partial support of teacher workshops and interpretative workshops.

If you wish to submit a proposal to the V. M. Slipher Committee, please note the following criteria:

1. The objectives and procedures to be followed in the project should be outlined in concise terms.

2. The budget page should identify how funds will be spent (please note any other funds allocated to this project, both direct and in-kind).

3. Proposals should be short—no longer than three typewritten pages. An original and four copies of the proposal must be submitted to be considered for funding.

4. Applications must be postmarked by May 24, 1996. Notification of grants will be made around July 31st.

Please send applications to:

Dennis Schatz, Chairman
V. M. Slipher Committee
Pacific Science Center
200 Second Ave. North
Seattle, WA 98109

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Jacksonville FL) who recently tied the knot!

Museum of the Rockies’ Taylor Planetarium) said that everyone for receiving the position of Producer of the construction in Columbus, GA on their baby boy, "Harry." Mike Murray (Taylor Planetarium) is also retiring this year.

Did You Know...
The GLPA meeting in Grand Rapids was “a whopping success” according to Rob Lands (Space Telescope Science Institute). Guest speakers Heidi Hammel and Tom Jones were big hits. Rob was one of the wonderful speakers we were treated to at IPS ’94. He is no longer attached to the public outreach office at STScI; he’s accepted a position with PRESTO—the Project to Re-Engineer Space Telescope Observing.

Fleischmann Planetarium had an unusual hot experience last winter. Keith Johnson reports that one of their speakers caught on fire during a show. The program operator “swears he didn’t have the sound turned up higher than usual.” Adam, the technician, thought it was a joke at first and was waiting for the punch line when the program operator reported it. (“Well, the dome exploded and the building’s on fire, but aside from that everything is cool. How are you?”)

Dixie Brooks (Russell Planetarium, Mesquite Sch. Dist.) is retiring; she’s been Jim Rusk’s assistant for some time. Harold Van Schalk (Garland Planetarium) is also retiring this year. Pam Eastlick (Putnam Tasi Planetarium, Guam) has been very busy. She writes a new show every month between September and June—all a killer schedule! During last fall’s solar eclipse, she prepared a Solar Eclipse booklet (with assistance from Dennis Mammana of Reuben Fleet and other contributions) and distributed copies to the governments of the Federated States of Micronesia, the Republic of Belau, and the Commonwealth of the Northern Mariana. Apparently, the entire population of two islands (Toby Island and Helen Reef, the two southernmost islands of Palau) headed out to sea with pinhole projectors into the path of totality! Great job of spreading astronomical information to the people!

Last November, Bob Berman spoke on “The New Solar System” at Schenectady Museum & Planetarium; they managed to squeeze 100 people into their 80 seat facility. Two weeks later, Planetarium Director Richard Monda appeared with Bob on Northeast Public Radio to discuss the Galileo mission on the call-in show, VOX-POP.

Alexandra Lovell (“the Domeless Planetarian” in Northants UK) is working up plans for the new facility to be finished 1999/2000, and is considering laser shows—apparently not commonly found out there. Alex is hoping to have “a shell to take people round during IPS ’98 in London.” Does that mean you hope to have a dome to show people, or is “shell” slang for a bus?

The Buhl Planetarium show “Through the Eyes of Hubble” continues to do great—it has been translated from English into six other languages and has sold 70 kits worldwide.

There’s a web page in the Internet sponsored by the Bishop Museum Planetarium in Hawaii that has information on a possible IPS tour of the Keck Observatories. Members planning on attending the Japan Conference in July may want to check it out at http://www.bishop.hawaii.org/bishop/planet/maunashow.html.

Happy Spring Equinox and Easter to everyone, and if you hear good, unusual, or funny news about any planetarium or planetarian, please send it in!

Our Condolences:
By now, you’ve probably heard that McLaughlin Planetarium in Toronto has been closed as a result of budget cuts. Tom Clarke and Ian MacGregor were kept on (at least temporarily) in Museum positions. Not only does it mark a setback for those involved and the planetarium community at large, it’s also very ironic, considering that both public and school attendance were up, and Seiler Instrument’s summer ‘95 newsletter featured the facility in their “Planetariums Around the World” column. The last paragraph stated “The McLaughlin Planetarium is open seven days a week and is wheelchair accessible. It will celebrate its 30th year of operation in 1998.”

Congratulations
to Laura Metiak for receiving the 10-month internship at the Schenectady Museum & Planetarium.
to Jeff Hunt (Waubonsie Planetarium, Aurora IL) for successfully defending his doctoral dissertation and graduating from Northern Illinois University in Instructional Technology.
to Pat McQuilan (Brest Planetarium, Jacksonville FL) who recently tied the knot
to Kevin Scott (formerly an intern at the Museum of the Rockies’ Taylor Planetarium) for receiving the position of Producer of the new Digistar/Omniscan planetarium under construction in Columbus, GA. Mike Murray (Taylor Planetarium) said that everyone there is very proud of you!
to Phillip Gross (HPS) and his wife Julie on their baby boy, “Harry.”
to Carolyn Petersen (Loch Ness Productions) for Hubble Vision: the bad news is that it is completely sold out—new copies won’t be available for awhile.
to Seiler Instrument and Manufacturing Co., Inc. which celebrated its 50th year in business last September.

Publications
You will be glad to know that the Sourcebook is progressing, albeit slowly. As far as the Special Effects book is concerned, very little new material has been submitted, but you still have a month in which to let me have your contributions. We would like to incorporate those which have already been printed in the Planetarian, so would you please let me know by the end of May if you would prefer your contribution not to be included in a more permanent publication. The end of May is also the deadline for you to submit new entries.

— Undine Concannon
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My first eight years as a planetarian were spent under a non-perforated, plaster dome. Besides having a planetarium that doubled as an echo-chamber, I had to endure producing shows in a facility where there was no provision whatsoever for utilizing behind-the-dome imagery. (Fortunately, I no longer work with that limitation.) However, in many planetaria with perforated domes, the use of this class of very bright, super-distinct behind-the-dome images is under-utilized. In this installment, I'll detail an extremely inexpensive method for placing light patterns behind the dome, and one which can open up an array of visual possibilities.

For years, planetarians have used the holes in their domes to visual advantage. Many of us are already familiar with the "grain-of-wheat" effect used to simulate distant supernovae, the Christmas Star, and occasionally, even the planets Venus and Jupiter (in the case of facilities whose instruments possess terribly dim planet projectors). In these situations, a chosen perforation is usually enlarged enough (with a drill bit) to insert a tiny grain-of-wheat bulb into the dome skin, and the bulb is wired to the control system through an appropriate low-voltage supply. In recent years, some folks have graduated to using fiber-optics in a variety of ways to enhance their behind-the-dome visual capabilities, though this type of device can start to get rather pricey if used for many effects.

Another behind-the-dome device is a favorite of ours here at Morehead—something we simply call the "coffee-can effect" (Figure 1). Basically, it consists of a large coffee can—open on one end, a lamp and socket mounted inside the other (closed) end, and a flat flange attached around the open end of the can—onto which are taped a diffuser and mask. This assembly is attached—flange-side forward—to the backside of the dome, using two lengths of magnet wire.

A standard line-voltage incandescent light bulb is used to provide the light in the coffee can. The light is then diffused by a layer of vellum (high-quality artists' tracing paper), and is masked off into whatever patterns are desired by a piece of black construction paper cut with openings of selected size(s) and shape(s). The light then streams through the dome perforations and is visible as a bright pattern to the audience. The advantages of this design are that (a) no special low-voltage supply is needed (as with the grain of wheat lamp), (b) no hole-enlargements must be drilled into the dome, and (c) no expensive slide or filmstrip projector or fiber optics must be used. In addition, effects aren't limited to single or multiple points of light scattered about, but can be made up of patterns whose sizes and shapes can be up to the size and shape of the coffee-can opening. Also, these effects can be constructed for very little money, and are really bright and crisp.

Among other things, we've used these coffee-can devices to simulate the sun (in the case of our Halley's Comet show), a distant supernova (by using a small-diameter mask) and to mark positional points on slide-projected maps and charts.

Construction

The first task in building one of these behind-the-dome devices is to secure a large coffee can, or a can of similar size. We use cans with a diameter of about 150 mm (6 inches), and a height of around 170 mm (6.75 inches). If you aren't a coffee drinker or need several cans at once, try connecting with a local restaurateur. Food establishments get some of their foodstuffs in these large cans, and if you make the appropriate contacts you'll probably end up with all the cans you'd ever want for no cost at all. In addition, you'll need the following materials:

- thin plywood scrap
- vellum
- black construction paper
- black masking tape
- black paint
- magnet wire
- lamp cord
- a lamp socket
- a light bulb
- a few small machine fasteners
- small-diameter threaded rod
- quick-dry epoxy

To begin construction with an open, empty can, mount the lamp socket on the inside-center of the can's closed end using small machine screws and nuts. After that, electrically wire it up, feeding the lamp cord through the can using a drill-hole and a crimped hole-style strain-relief, and connect a plug at the other end for later hook-up to your control system. Now, add two magnet-wire "tie-downs" on the closed can-end. This is easily accomplished by drilling small holes opposite each other near the can's lip and mounting moderately-long machine screws—protruding well out of the can—with two nuts for each, above and below each screw hole.

Next, cut a flange out of thin plywood. To do this, measure out a square on the wood stock a good bit larger than the diameter of the can (approximately 75 mm, or 3 inches, larger will do fine). Next, mark a circle in the center of the plywood square using the can as a drawing template, and cut out a hole using a starter drill-hole and a jigsaw. After painting flat-black both the plywood flange and the can exterior (leaving the can interior...
works well here) simply mark that position with a pen, pencil, crayon, etc. Then the can is placed over that spot, and two other marks are made for the magnet-wire anchor-points. Place one of these marks slightly above the top edge of the flange and closest to one of the tie-down screws on the back of the can (rotate the can, if necessary, to place one of the tie-down screws at the top of the can's closed end), and the other mark at the opposite flange-edge—once again, nearest its corresponding tie-down screw (or near the bottom).

Each length of magnet wire will actually be threaded though two adjacent perforations at these marks and then tightly twisted so as to effectively create a firm anchor to the dome. For each anchor point, cut a piece of wire about 0.3 meters (12 inches) long. Take one end of the wires and bend it as seen in Figure 4—with the straight-line measurement across the bend approximately the same as the spacing between dome perforations. Next, insert this bent wire-end into a perforation (Figure 5, depicted with the dome-skin in cross-section), and carefully rotate it around so that the tip of the wire protrudes back through to the dome exterior again, via an adjacent perf (Figure 6). Threading the magnet wire takes a little practice as it's easy to end up with the wrong shape, or to inadvertently re-bend it as you're inserting and rotating the wire. Practice getting it right several times near the base of the dome before you try doing it from a location. Now grab the tip of the wire with some needle-nose pliers (Oops! I forgot to tell you before you climbed all the way up there ...) and pull the wire about 1/2 to 2/3 of a finger-length back through (Figure 7). Once that's complete, twist the parallel portions of wire together—forming a tight, multi-twisted plait (Figure 8). Once you've done both wires this way, replace the can into position. Pulling each wire taut—wrap the wire repeatedly around its tie-down screw on the can, and then back around itself several times. This procedure should securely anchor the can flat against the dome. (By the way, because of the small size of the wire exposed on the dome interior and the audience's viewing-distance, it's impossible to notice the bits of wire.)

Now, using a nylon cable strap (gosh, another trip down ... sorry!), tie unpainted will allow the highly-reflective surface to enhance the brightness and evenness of the light through the vellum diffuser), insert the open can-end into the hole of the flange and cement it there with epoxy (Figure 2).

Once the epoxy has hardened and a suitable-wattage light bulb is installed, you can make and attach the black construction-paper mask and vellum diffuser (Figure 3). Cut a square from construction paper about 30 mm (1-1/4 inches) smaller than the plywood flange, and then cut out openings of the required size and shape within the square—making sure to stay within a circular area in the paper's center which is no larger than the can's diameter. After that, cut out a square of vellum a bit smaller than the construction-paper mask, but a bit larger than the can's diameter. Once that's done, you can tape the edges of the vellum over the center of the mask, and likewise tape this assembly over the flange—with the vellum against the flange. Also note that colors can be added to your light patterns, as well, by adding colored transparent acetate to the mask/diffuser stack. In this case, tape the acetate to the inside (flange side) of the vellum, as exposing the shiny surface of the colored plastic outside of the vellum or mask can lead to unwanted reflections during shows if slide images are projected over the can's mounted dome-position.

**Mounting and Attaching**

You are now ready to mount this little contraption onto the backside of the dome. Once you (or another brave soul) have climbed into position behind the dome and determined your exact placement (we've found that a small flashlight aimed through the dome's backside while an observer watches and directs placement from inside the planetarium chamber... Planetarian... Vol.

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works well here) simply mark that position with a pen, pencil, crayon, etc. Then the can is placed over that spot, and two other marks are made for the magnet-wire anchor-points. Place one of these marks slightly above the top edge of the flange and closest to one of the tie-down screws on the back of the can (rotate the can, if necessary, to place one of the tie-down screws at the top of the can's closed end), and the other mark at the opposite flange-edge—once again, nearest its corresponding tie-down screw (or near the bottom).

Each length of magnet wire will actually be threaded though two adjacent perforations at these marks and then tightly twisted so as to effectively create a firm anchor to the dome. For each anchor point, cut a piece of wire about 0.3 meters (12 inches) long. Take one end of the wires and bend it as seen in Figure 4—with the straight-line measurement across the bend approximately the same as the spacing between dome perforations. Next, insert this bent wire-end into a perforation (Figure 5, depicted with the dome-skin in cross-section), and carefully rotate it around so that the tip of the wire protrudes back through to the dome exterior again, via an adjacent perf (Figure 6). Threading the magnet wire takes a little practice as it's easy to end up with the wrong shape, or to inadvertently re-bend it as you're inserting and rotating the wire. Practice getting it right several times near the base of the dome before you try doing it from a location. Now grab the tip of the wire with some needle-nose pliers (Oops! I forgot to tell you before you climbed all the way up there ...) and pull the wire about 1/2 to 2/3 of a finger-length back through (Figure 7). Once that's complete, twist the parallel portions of wire together—forming a tight, multi-twisted plait (Figure 8). Once you've done both wires this way, replace the can into position. Pulling each wire taut—wrap the wire repeatedly around its tie-down screw on the can, and then back around itself several times. This procedure should securely anchor the can flat against the dome. (By the way, because of the small size of the wire exposed on the dome interior and the audience's viewing-distance, it's impossible to notice the bits of wire.)

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up the power cord to a nearby dome support, so as to keep the weight of the cable from pulling down on the can. Once you've connected the power cord to your control system, you've got your light-pattern ready for use in your shows. You can use these coffee cans singly or in groups to create light patterns in various arrays, if desired.

To Refine the Design

By now, though, you've probably noticed a design-flaw and asked yourself, "What happens when the light bulb burns out inside the can?"

Obviously, you don't want to be detaching the can from the dome, removing the mask and diffuser, re-taping the mask and diffuser, and reattaching the can to the dome—all while hanging by your toes! The solution is to build your coffee-can effect as shown in Figure 9 (shown in exploded view). This revised design requires a little more involved construction, but you'll thank yourself when "lamp-changing time" comes. The key to this design is to create a removable rear-end to the can. Since the lamp and socket are mounted onto this end, withdrawing the rear of the can effectively removes the socket and bulb, facilitating easy lamp changeout.

However, instead of cutting-out the entire end of the can, leave a narrow ring of metal there, which will serve as an inner flange onto which a separate removable disk can be mounted. Just cut out the center area of the original can-end with a jigsaw and metal-cutting blade—starting the cut with a drill-hole. Next—using the jigsaw or a band saw with a metal-cutting blade—cut out a disk just slightly smaller than the can's lip from thin, rigid sheet metal (or you can use thin plywood as long as it's later covered with aluminum foil for heat-protection). Using some small-diameter threaded rod you can cut and bend two or three small threaded "Ls", which will serve as studs for attaching the disk to the can. For each "L" drill a small hole on the remaining ring of metal near the can's lip and another down the side of the can about 15 mm (5/8 inch). The "Ls" can then be inserted into both holes from inside the can, anchored with two nuts each at the side holes, and left to protrude a centimeter or so out through the rear holes. Once corresponding holes are drilled into the disk, it can be attached to the can by way of nuts on the rear ends of the threaded-rod sections.

Of course, this change will mandate that the wire tie-down screws be moved off the rear of the can, so that the wires need not be detached during lamp change. Simply drill and mount the tie-down screws a bit further down the cylinder of the can in this design. All that remains is to mount and wire-up the lamp socket to the removable disk, and to complete assembly before your behind-the-dome installation. This design will allow you to keep the can installed on the dome—and the mask, diffuser, and color filters assembled to the square flange—while you perform a future lamp-changeout.

Cautions and Applications

A variety of lamp-wattages can be used in these devices. We've used lamps up to 100 watts successfully in our cans. However, it's important to keep heat buildup in mind when choosing and using lamps in these effects. For example, it's not prudent to leave cans with 60- to 100-watt lamps up at full intensity for more than a minute or so at a time. While this restriction normally isn't a problem when running most shows, it can be of concern when on-line programming with an automation system. In these situations, it is probably prudent to intentionally program these devices for a lower-than-normal lamp level until you've nearly finished polishing the relevant scene. Otherwise, since the on-line programming process can effectively leave projectors and other effects up for extended periods, overheating...
ing could be a real possibility.

Many planetarians have only limited behind-the-dome access, since many facilities lack catwalks. Nonetheless, most folks with this restriction can still place effects behind the dome. A good extension ladder can go a long way toward facilitating placement of these effects, and some museums—in the case of planetaria located in such a parent institution—have mobile lifts available. Whatever approach you take, always exercise plenty of caution when placing cans, or any behind-the-dome effect. At working heights of 15 to 20 feet, or more, it only takes one misstep to turn a routine effect-installation into a major accident. Please, be careful!

Coffee-can effects should be of use even to those folks who are simply too uncomfortable to climb a ladder. These devices can make great additions to a variety of panoramic scenes, such as nighttime vistas of cities or suburban neighborhoods. For these, coffee-cans with multiple rectangular masks can supply strikingly realistic visualization of interior building windows that really pop-out at the audience—providing an almost three-dimensional character to a projected silhouetted panorama. Likewise, you can use this technique to add distant city lights to a nighttime Earth-chord, or distant lightning flashes to a Jovian-limb pan. And all of these can be placed without doing much, if any, climbing or work at significant heights. You could even use these devices to create bright simulated flashing lights for a panorama of an interior spaceship console!

There are all sorts of other visual applications for coffee-can effects, too. By using a small (10 mm, or 3/8 inch), round mask-hole, it’s easy to simulate a distant supernova, or distant Sun as seen from Pluto. In the case of more terrestrial visualization, the diameter of the cans makes them well-suited for mimicking the Sun and the Moon as seen from Earth—even in large domes. This makes the devices a natural where the star-projector Sun and Moon are dim and faint, as with Digistar and some Spitz machines. Of course—unlike the star machines’ projections—these effects cannot be moved around. But in those cases where a nice, bright fixed Sun or Moon is needed in the sky for a show-scene, coffee cans really fit the bill. In the case of the Moon—with just a smidgen of artistic flair—“lunar maria” can be shaded-in on the vellum diffuser to create a moon of considerable realism. And you can create a nice Sun that will hold up even with blue covelights for daytime scenes. At Morehead, we’ve even used multiple cans to construct summer and winter Sun-paths on the dome—great for use in teaching the seasons. For this we used ten cans to create the summer path, and seven for the winter (boy, was that a lot of climbing!) Besides serving as a valuable concept-teaching aid, these Sun-paths are also very impressive-looking!

Coffee-can effects can add a lot of visual punch in your presentations, with very little investment of time or money, and despite limitations in technical expertise. Though they don’t employ motion, their sheer brightness and crispness can make them a great addition in many presentations. ✪

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**QUESTION:** What is the most frequently asked question about 'STAR HUSTLER'?

**ANSWER:** That's easy. Everybody asks about our theme song which is the classic 'Arabesque #1' by Claude Debussy performed by Tomita on the still available *Snowflakes Are Dancing* album (RCA).

**QUESTION:** At what times and days of the week can I see 'STAR HUSTLER'?

**ANSWER:** Most TV stations air 'STAR HUSTLER' just before nightly sign-off. However, due to 'STAR HUSTLER's' enormous popularity a number of stations find the show's 5-minute format can fit anywhere during the broadcast day and air the show more frequently. Local TV listings seldom include 5-minute shows, so it's best to call the station for the broadcast schedule.

**QUESTION:** If I can't find 'STAR HUSTLER' on my hometown PBS station, how can I see it where I live?

**ANSWER:** 'STAR HUSTLER' is provided free of charge by WPBT, Miami to all PBS stations. If you can't find it, write or call your local PBS station and ask if they will air it and remind them that it is available free of charge.

**QUESTION:** Is it necessary to get special permission to use 'STAR HUSTLER' for astronomy club meetings, teaching in the classroom, science museum or planetarium use?

**ANSWER:** No. In fact, many astronomy clubs, teachers, science museums and planetariums have been taping 'STAR HUSTLER' off the air and using it regularly as a way to reach their public.

**QUESTION:** Is there any way I can get 'STAR HUSTLER' other than my local PBS station?

**ANSWER:** Yes. A month's worth of 'STAR HUSTLER' episodes are fed monthly to a satellite from which all PBS stations take it for their local programming. Anyone with a satellite dish is welcome to the satellite feed. Again, no permission is required. For satellite feed dates and times call Monday through Friday (Eastern time) 305-854-4242. Ask for Mrs. Harper or Mr. Dishong.

**QUESTION:** I am a teacher planning my curriculum and would like several 'STAR HUSTLER' episodes in advance, but I do not have access to a satellite dish. Is there any other way I can obtain 'STAR HUSTLER'?

**ANSWER:** Any teacher anywhere around the world can obtain 'STAR HUSTLER' episodes in advance through their NASA C.O.R.E. Teachers’ Resource Center. For details write: NASA C.O.R.E.; Lorain County Joint Vocational School; 15181 Route 58 South; Oberlin, OH. 44074.

**QUESTION:** Why does 'STAR HUSTLER' always say "Keep Looking Up!" at the end of each show?

**ANSWER:** Have you ever tried star gazing looking down?

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**KEEP LOOKING UP!**

**JACK HORKHEIMER: STAR HUSTLER**

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George Lovi, Astronomer
American Museum/Hayden Planetarium

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John Nathan Turner, Executive Producer, 'Dr. Who'

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PIPS September Meeting:
The sixth PIPS Users Group meeting was held on Saturday, September 23, 1995. Thirteen energetic and powerful small and portable planetarium users shared participatory techniques and materials and solved the problems of our small worlds! Our host facility was the Science Museum of Long Island (Plandome, NY) where Dr. John Loret is director. For over 30 years this museum has been making science fun for thousands of students through hands-on experiments and graphic demonstrations. They specialize in participatory workshops for the young and "young at heart." Located on Leeds Pond Preserve in Nassau County, this beautiful 15 hectare site offers infinite opportunities for a variety of outdoor programs: field, forest, salt marsh, brackish pond, freshwater stream, and estuarine beachfront. It was a beautiful and serene location for our meeting. The museum itself was fascinating, it's a converted 28-room mansion built in 1911. Steve Tomecek, dynamic company Science Plus (1559 Jericho Turnpike, New Hyde Park, NY 11040; 806-298-2022), was our co-sponsor and brought the latest equipment and materials from Starlab, Project Star and Learning Technologies, Inc. for demonstration. The minutes of this meeting will be published in the "Starlab News" and will also be directly mailed to 100 PIPS members.

First European Meeting for Itinerant and Small Planetaria: (Report prepared by Loris Ramponi and Susan Reynolds)

Forty astronomers and planetarians met in Lumezzane (North Italy) on October 13-15, 1995 for the first European meeting of Itinerant and Small Planetaria. This meeting was organized by the Italian Planetaria’s Friends Association and the IPS Portable Planetarium Committee. Participants stated that these were three days of intensive interaction with colleagues. They were very long days and extremely worthwhile. The friendships and contacts formed will extend a vital network that began in Richmond at the 1988 IPS meeting. The purpose of this network remains to join locations of mobile and small planetaria in an effort to assist one another to develop and thrive effectively and efficiently.

There was representation at this first meeting from eight countries: France, Italy, Norway, Slovakia, Sweden, Ukraine, United Kingdom, and United States (California, New York, Massachusetts, Nevada). A wealth of information was collected about existing itinerant planetaria in Europe and diffuse experiences and techniques of mobile planetaria.

Meeting Activities included:
Lessons in American
"Messages From a Time Traveler" using Starlab (presented by Susan Reynolds, IPS Portable Planetarium Committee)
The lessons were presented to Italian Secondary Students of English and meeting participants.

An annual Teacher Exchange Program was established as a result of the success of this experience and interest of teachers (information about this included below).

Demonstrations of various models of small and itinerant planetaria and domes
Cosmodyssee II, Gambato, Goto EX-3, Starlab, and Ray Worthy's homemade dome were examined.

Demonstrations of practical lessons through workshops
First National Starlab workshop devoted to revealing the versatility of Starlab and its fifteen different cylinders (conducted by Susan Reynolds, IPS Portable Planetarium Committee);

Pedagogic Aids Workshop about the use of paper, glue, and scissors to make sundials, astrolabes and other teaching instruments useful outside the dome to extend the planetarium experience (conducted by Michel Dumas, Le Val d'Oule, France);

"Celestial Navigation under the Starlab domes (conducted by Philip Sadler, Harvard University/Learning Technologies Inc., Cambridge, Massachusetts, USA).

Communications by Invitation

"Astronomical Itineraries For Schools and Public" included information about a census of sites of interest for the teaching of astronomy such as planetaria, observatories, sundials, astronomical monuments, archaeoastronomy sites, meteorite craters, mini solar system models made in natural trails or parks and so on (presented by Dieter Vornholz, Cubers Planetarium, Hochschule Bremen, Germany).

"Italian Galileo Model III Planetarium" included a brief description of this currently out-of-production model (presented by Angela Turricchia, Aula didattica Planetario, Bologna, Italy). A more detailed paper (by Renzo Berlincioni, planetarium maker, Florence, Italy) will be published in the proceedings. Ms. Turricchia also spoke about activities of didactical experiences with children from Bologna primary school using a half-dome Galileo planetarium, pictures, fables, and a few mathematical accounts.

"The History of Planetariums" prompted some discussion about the role of itinerant and small planetaria and the direction which they seem to be taking with regards to education/entertainment (presented by George Reed, Spitz Inc., West Chester University, Reno, Nevada, USA).

"Astronomy for the General Public at Astrorama". Participants were treated to an exciting video clip as Jean-Louis Heudier (PARSEC, Nice, France) spoke about the eight years of planetarium and astronomy provided for the general public at Astrorama, an education center in the south of France.

"Astronomy Activities in Slovakia". Patricia Lipovska (Presov Observatory and Planetarium, Humranovo) and Marian Vidovenec (Slovak Central Observatory, Hurbanovo) presented information about the current situation and activities at their locations.

Mythology of the Heavens Puppet Show
This delightful show was presented by the Astronomical Association of Rovigo in collaboration with the Teatro Amico.

Remembrance
A time was set aside during the meeting to remember Guido Casadei, an Italian planetarian and President of the Brescia Astronomical Association, who died in September of 1995. A portion of his collection of over 300 astronomical stamps was shown.

Annual National Conference of Italian Planetaria
This conference ran concurrently with
the European meeting on October 14th.

"Shadows of Time" IV Annual Contest and Awards Ceremony

During this conference there was an open exhibition of sundials built by contestants in the fourth annual international contest “Shadows of Time”. Everyone attending both meetings (European and National) participated in a ceremony where awards were presented to the winners of this contest.

**Evening at the Specola Cinecittà Astronomical Observatory**

Meeting participants joined the General public in a visit to this unique observatory situated in a Castle on top of a hill in the center of the city of Brescia. Skies cleared enough to view several beautiful deep sky objects.

**Trip to Serafino Zani Astronomical Observatory**

Clear skies greeted participants as they approached this magnificent, wonderfully equipped observatory. This facility is the promoter, in Lumezzane, of a variety of astronomical and scientific activities. Both students and the general public are served by the observatory, four different planetaria as well as a large store of interactive exhibits and teaching instruments.

**Guided Visit to a XVI Astronomical Clock**

The meeting ended with a guided visit to the Piazza Loggia in Brescia where Giovanni Paltrinieri, a celebrated gnomonist, gave a detailed explanation of the complex XVI astronomical clock built to be viewed from both sides of the tallest building.

**Post Conference Tour**

Luca Talamoni, Marghera planetarium director, organized a tour to Venice which included visits to the Marghera Planetarium and Museum and the Venice Planetarium. Demonstrations in these planetaria allowed participants to see Mr. Gambato’s very impressive projector and technology in action. (Mr. Gambato builds precision planetarium projectors and observatories.) The enlightening and humorous stories of Mr. Talamoni and Mr. Gambato were also enjoyed by all as we were guided to view historic Venice.

**Conference Conclusions**

During a final discussion period it was proposed that European small and portable planetarians continue the experience of the meeting with a bi-annual appointment. The next meeting could be organized in 1997 and then alternate with the International Planetarium Society Conference. Two publications, "Guidelines for the Next European Meeting of Itinerant and Small Planetaria" and "Proceedings" of the 1995 meeting, will be compiled to aid the next meeting organizers. The Proceedings will include a list and descriptions of itinerant planetarium makers world wide, sources for instruments and publications about teaching astronomy, a list of addresses for regional/national/international planetarium associations (and if existing, the addresses of the portable planetarium representative of each organization), a directory of all known European itinerant planetaria users, copies of papers delivered at the meeting and a copy of the report from the American teacher (including the lesson text and student comments). These publications may be obtained by writing to: Loris Ramponi, A.A.P. - Archivio Nazionale Planetari, Centro Studi e Ricerche Serafino Zani, via Bosca 24, C.P. 104, 25066 Lumezzane (BS) or; Susan Reynolds, OCM BOCES Planetarium, Syracuse, NY 13221 USA

**Teacher Exchange Opportunity:**

A Week in the North of Italy
A Proposal for an American Planetarium Operator

Each year Serafino Zani Astronomical Observatory (Lumezzane/Brescia), in collaboration with the IPS Mobile Planetarium Committee and with the support of Learning Technologies, Inc., will host an American Planetarium Operator who presents lessons with the itinerant planetarium Starlab to high school students of English. Transportation from the United States will be provided, along with bed and meals from Tuesday to Sunday.

The program for the week is as follows:

**From Wednesday to Friday** Starlab lessons in a secondary school.

There will be no more than three every morning for a total of three each day. Each lesson will be at least 60 minutes in length and can be about traditional topics for planetaria such as: daily motion, orienteering, latitude motion, solstice and equinox, constellations, mythology and so on.

Or, the non-astronomical Starlab cylinders can be utilized for a lesson about such topics as: biology, tectonics, geography, ocean currents or meteorology.

The final part of the lesson could be dedicated to Native American mythology by using the related Starlab cylinder (or other ancient mythologies such as Chinese or African).

During the afternoons there are no other engagements. The operator has free time for a tourist visit in the area and in the nearest cities. Lumezzane is very rich in the public astronomy field with the Serafino Zani Astronomical Observatory, four small planetaria, the Eureka Astronomical Center and the National Archive of Planetaria. Brescia Province is very interesting for its natural landscapes and parks, three lakes, and an important valley for prehistoric age stone engravings. Important artistic cities, such as Verona and Venice, are one or two hours distance by train.

**Friday Evening** Residenza "Le Rondini," Lumezzane: A presentation of Native American (or African or Chinese) mythology and constellations for the general public.

The presenter will provide an introduction with slides and then a presentation under the Starlab dome. Probably the planetarium projection will be repeated for two groups.

**Sunday:** Eureka Astronomical Center Annual workshop for teachers and planetarium operators.

This workshop is advertised at the national level. The presenter will demonstrate the versatility of the Starlab planetarium and all the cylinders.

**Culminating Documentation**

We request that a final report be written by the American teacher which will include the text of the High School lesson, comments from the students and impressions of the experience.

For other information and to receive the report of the first experience about American Lessons with Italian Students, write to:

Susan Reynolds
IPS Portable Planetarium Committee
OCM BOCES Planetarium
PO Box 4774
Syracuse, NY 13221 USA
Phone: 315-433-2671
Fax: 315-433-1530
E-mail: sreynold@cmvm.cnycric.org

Or

Osservatorio Astronomico Serafino Zani
c/o Centro studi e ricerche Serafino Zani
Via Bosca 24 - C.P. 104
25066 Lumezzane (BS), Italy
Fax: 30/87 25 45

**New Planetarium/Observatory Builder Heard From:**

Materials are now in my files pertaining to a planetarium and observatory dome construction company established by Mr.
Gambato di Costruzioni per Astronomia, Gambato snc, V. Martiri n 100 30038 Spinea, Venezia, Italy. I have seen examples of his work and was very pleased by its precision and care for detail. The starfield I saw was beautiful, both accurate and crisp. His literature states:

**Dome For Observatories**

Our domes can be made up of 8/10 mm zinc sheet pieces, or 7/10 stainless steel, or 12/10 aluminum, or 10/10 copper to withstand any kind of weather. The pieces are kept together with zinc-plated or stainless steel screws. According to their size, their weight goes from 300 to 900 kg. Our domes are settled on wheels running on rails and they are fixed on an iron frame. Thanks to that, our domes can be installed both on terraces and roofs.

The rotation is accomplished by a motor-reducer working at 220 VAC and it can be controlled directly by the hand-controller. The internal frame is made up of zinc-plated iron and that guarantees total protection against rust. Besides, due to this kind of frame, the maintenance of the dome is very easy thanks to the thickness of our domes, near the running wheels, is 6-8 cm maximum.

**Planetariums**

Particularly suitable for didactic and popularizing purposes, the planetariums we manufacture are made up of a metallic sphere whose pinholes (Susan’s note: each hole is lensed) allow the projection on a domed vault of all the constellations visible to the naked eye in both hemispheres, north and south, up to a total of 1400 to 5000 stars, that is, up to 600 magnitude. The images of the stars appearing on the vault change according to their real magnitude. Their diameter is about 3 mm.

Besides the stars, our planetariums are equipped with the planet projectors (Sun, Moon, Mercury, Venus, Mars, Jupiter, Saturn) as well as the hour circles: celestial equator, ecliptic plane, and meridian circle.

Our planetariums are even provided with electric motions controlled by an operational console: diurnal motion, declination motion, precessional motion.

On request, we can add other impressive effects like a galaxy in rotation changing its size, the explosion of a supernova causing its relative nebula, the birth of some stars, both solar and lunar eclipses, etc.

**Domes For Planetariums**

The planetarium domes are built in aluminum 3 mm thick. They are perfectly smooth inside and white-painted. Because of these reasons, they allow a perfect and realistic vision both of the stars and the planets that are projected. (Susan’s note: These planetariums are telescopic view images). Our domes are settled on a metallic ring support which even shows the luminous cardinal points and provides a console-driven variable luminosity of the artificial horizon. As a consequence, the celestial vault is shown in its real vision.

Just to simplify their transport and assemblage, our domes are built in four or more pieces. According to their diameter, their weight varies from 200 to 300 kg. (Susan’s note: Pictures and the price list were sent to me also. If you are interested, I would be happy to send you a copy.)

**GLPA Produces a Planetarium Program:**

A Solar System Adventure Tour is a planetarium program written and produced by Dave DeRemer, director of the Charles Horwitz Planetarium in the School District of Waupasha, Wisconsin (414-521-8841). The original music and soundtrack is by Bowen Music Productions and the original artwork is by Ray Strong. Dave says, “The purpose of this program is to provide the members of the Great Lakes Planetarium Association with an inexpensive, participatory, solar system program for use with middle elementary students (ages 9-10). Visuals are designed to be as simple as possible, a minimum of one or two carousel projectors can be used. The audio, although originally produced with high quality digital sound, can be run on a cassette tape player. Other formats may become available.”

**Other Correspondence:**

Luis Paulo Carrasqueiro (lpc@astro.up.pt) writes, “Ray Worthy from the UK asked me to e-mail you giving some information about our Starlab. I work for the Centre for Astrophysics of the Porto University in Portugal. This is an astronomy research centre that has some activities in communications of astronomy. Five years ago we started a project called ‘Astronomy at Schools’ in cooperation with local authorities. We use a standard Starlab and we’re usually busy five days a week with six sessions a day. There is a great demand for our services and the planetarium travels through the country. The presenters are all final year students of the Porto University Astronomy degree. At this stage I think we are the only full-time active portable planetarium in the country, although I know there are several other Starlab domes which are not being used. I hope this is of any help.”

(This is a wonderful communication about what is going on out in the world. I am so grateful for people who can shed some light on what is happening in their countries.)

Paul Deans (Programme Director, Pacific Space Centre, 1100 Chestnut Street, Vancouver, BC V6J39, Canada) tells me he currently has one Starlab and will purchase a second in January 1996. His planetariums are rented out to teachers who have been trained in its use, sent out with one of their presenters, or sent to a contractor who presents programs in remote areas.

Pete Dorofy (11 Meadowbrook Drive, Westampton, New Jersey 08060 USA) is starting a business in the south part of New Jersey with a Starlab. I sent him the wonderful paper that April Whitt wrote, “Owning Your Own Planetarium”.

Peter Elfant (c/o Marc Elfant, Zorrilla 25 #2, Madrid, Spain 28014) was from New York City and spent some time last spring in Syracuse with me, observing some lessons. He was going over to Spain to start a program with his father, who is Spanish and lives in Madrid. He writes, “I thought I would write you this short note to keep you appraised of the situation over here. As of this writing we are still trying to develop a program that will be workable here in Spain. One of the greatest difficulties is however the language. I have been attending intensive courses and it is apparent that I am no ‘Chopin’ language-wise. It is very difficult for me to communicate what is required, but it has to be done ... Currently we are trying to start a workshop for teachers in the private school system, a move that enables us to introduce the planetarium and the subject at the same time ... All our contacts here in education feel that we must have a program similar to yours in order to be more than a puppet show under the stars ... I myself have many questions about certain applications of the planetarium. For example, how do you demonstrate precession in Starlab? (hmmm ... that’s a good one! any ideas out there?) It comes down to that old paradox The more I learn the less I know.”

(Peter goes on to ask many other very good questions about Starlab and astronomy. He was never an astronomy teacher so he’s starting from scratch, as I did, but in a foreign language he is learning! I am so happy to hear from Peter and I’m in awe of the task he has chosen. I am sure he would love to hear from some others and maybe establish some other contacts in Europe.)
Steve Fleming (sflemm@pioneer.mov .vic.gov.au) is thinking of starting a business in Australia with Starlab. I sent April's paper to him too and Charles Trevean's address. (He is another one who owns his own Starlab in Australia).

Frank Gear, F.R.A.S. (251 Abington Avenue, Northampton NN32 BU, United Kingdom) works with one Starlab which is operated by the County Council and sent out to schools with a lecturer. He says, "I would welcome any information and help that you can provide to improve the overall presentation of my shows." I sent him a list of users in his area and the list of material in the IPS public domain files.

Patricia Lipovska (lipovska@aris.po .upjsk) keeps in touch through e-mail and is sharing some of her knowledge of mythology of the Slavonians and a program of "The Sky in Russian Fairy Tales". I will send her some materials about Native American Mythology.

Ian McGregor (McLaughlin Planetarium, Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario MSS 2C6 Canada) wrote to tell me the very sad news that the renowned McLaughlin Planetarium has closed. He writes, "I find myself having been reduced from having one of the finest astronomical centres in North America to falling back on the simplest of teaching tools." He is now "Science Educator" (no longer "Planetarium Educator") and needed information to write a proposal for establishing a portable planetarium outreach program. We must all work closely with Ian to make the best of what is, one can only hope, a temporary setback. In any case, a well-conceived and operated itinerant planetarium outreach program can enhance the stationary dome when it reopens. I sent Ian a copy of Alan Gould's IPS '94 paper, "Portable Planetarium Workshop III: Unmanned Satellite", and the list of materials in the IPS Public Domain file.

Steve Russo (BOCES Cayuga-Onondaga-Counties, Southern Cayuga Central School, Poplar Ridge, New York 13339 USA) bought a Starlab to augment his work with the stationary dome because his school cut him... back to part-time.

IPS '96 Conference:
I hope to see many of you in Japan in July. There should be some interesting itinerant planetarium workshops. Lori and I plan to share, in more depth, what we discovered at the European meeting in Italy and we are encouraging many others to come and share too. We will also have a meeting at some point during the conference for getting together portable users and representatives from each regional and national affiliate. Plan to be there to take the latest news home to your affiliate group. It will be very exciting to be in such an exotic setting.

Signing Off:
As you can see the world-wide connections continue to grow as our numbers continue to grow. I really love the e-mail system as I feel really close to all my new friends in many countries and it seems to truly make the world one community. Keep in touch.

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From the creators of "LifeStyles of the Stars" and "Sandy, Pepper & the Eclipse"

"MoonWitch"

Perfect as your next Halloween program!!

Ideal for grades 2nd through 5th and super as a family Halloween program. This planetarium production examines the nature of the Moon and its changing appearance in the sky. On Halloween we meet Billy and Diana, a brother and sister who are trick-or-treating. Diana notices that no matter where she goes, the Moon seems to follow. Back home, Mom and Dad explain Moon appearance and motion. At school Diana continues to share her new knowledge of the Moon with teachers and classmates and demonstrates why the Moon goes through phases. The program ends with Diana's discovery of the "dark side of the moon" and "earthshine." She tells her father that she sometimes dreams of being the first woman to land on the Moon...walking in the footprints of the Apollo astronauts! And...her lunar lander is named "The Moonwitch."

Author: Phil Groce.
Running time: about 17:00.
Includes 65 pin-registered glass-mounted slides.
Original art by Jim Chapman of Sudekum Planetarium.
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Review Committee: Steve Mitch, Christine Brunello, George Reed, and Sharon Parker.
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70 Planetarian Vol. 25, No. 1, March 1996
PARTNER * SHIP * EARTH
Our planet provides everything needed to support a large variety of life. Earth seems alive itself, caring for and nurturing its occupants. In this 25 minute program you will explore our fantastic planet from its violent birth to today and see how its composition, structure and wealth of resources make life possible. Find out what we can do to better enjoy and preserve the future of our world.
- 250 slides

** Davis Planetarium **

LIFE BEYOND EARTH
This 31 minute program investigates the possibility of extraterrestrial life. The show explores the number of stars in our galaxy, the places where planets may have evolved, the chances of life on other worlds and our search for intelligent life in the Universe. A science fiction story about future contact with an alien civilization weaves through the program.
- 368 slides

DESTINATION: UNIVERSE, OUR FUTURE IN SPACE
We dream of flight among the stars, but a trip to the nearest star will require a mastery of technologies we can barely imagine today. This 38 minute program takes you on a journey of the imagination from America’s Space Station Freedom, to planetary engineering projects ten thousand years hence.
- 321 slides

WORLDS OF WONDER
"Worlds of Wonder" explores exciting discoveries about the planets, moons and other worlds in our Solar System made during the last two decades with spacecraft like Viking and Voyager and other probes. Beyond the familiar nine planets, at least sixty moons, thousands of asteroids and billions of comets add mystery and adventure to our continuing investigation. Explore these fascinating "Worlds of Wonder" in this 25 minute program.
- 314 slides

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MARYLAND SCIENCE CENTER
NEW! “Don’t Duck, Look Up” Preschool Show Coming Fall ‘95
Greetings!

In our modern, rigorously planned lives, often it's the unplanned bits that add the spice to our experiences.

Last fall, I was recruited on short notice by a tour company to fill in for an ailing colleague who was to lead a small group of American eclipse chasers to Thailand to watch the sun go dark on October 24. Like most travel tours, the itinerary was planned in breathtaking detail—where to stay, when to go, what to do—with one notable exception.

Unlike most other eclipse tours—and this is the unplanned bit—our tiny group of ten did not warrant the usual pre-trip site inspection by the tour company, where advance arrangements were made for transportation, contingencies, food and water—even tents and backpacks. If we were going to stop?

Decha suggested a leisurely drive along the 20 kilometers to the next town after Khon Buri to scout out all the possible sites, but I knew that at least several people would burst before we completed such a scheme. And there was a ridge of low mountains to the south that was sprouting clouds, and I didn't want to get too close. The decision was clear: once we hit Khon Buri and knew we were at the centerline, we'd stop at the first promising site we found.

And so we did. A few kilometers southeast of the town, we spied an open area behind some roadside buildings; a policeman was directing other buses into the area, and we followed suit. What we found was a big, open paved surface used for drying tapioca root. We pronounced it acceptable, parked at the edge of the adjoining tapioca field, and began to unload our gear. It was an hour before first contact.

It turned out to be a serendipitous choice. If the truth be told, sometimes eclipse tour groups get a little segregationist. They have their own pre-selected sites, sometimes staked out or cordoned off, with their own amenities, sometimes quite removed from others so as not to be bothered during their intensely-focused efforts to set up and observe. The eclipse still comes, but to me, setting is half the experience, and sometimes I think such groups miss out on good portions of the rich local ambiance.

But as it turned out, had it in spades. As we prepared for the eclipse, more buses and cars and people filled in the margins of the pavement around us—parents with their children, Buddhist monks in saffron robes, school classes by the dozens with their teachers. By first contact, we were a lone group of Westerners surrounded by a small sea of local Thais; music started playing across the pavement, punctuated with the occasional pop of a firecracker.

The opening stages of the eclipse were plagued by burgeoning cumulus as the day warmed, but as the sun went away and the air cooled, the clouds dissolved into scattered cirrus by second contact. We were almost too busy to notice, for we had become magnets for the Thais around us, who pressed close for our offered peaks through our filtered eyepieces and viewfinders. One gentleman had a big audience for his solar projection, and I had a long line at my modest setup. The school kids giggled at my few poorly-pronounced words of Thai, but smiles and a little sign language were all we needed as they looked at the shrinking sun through my viewfinder and watched as I used my straw hat to make tiny sun images on the ground. These kids seemed quite well-prepared by their teachers, and many were armed with mylar-filtered sun viewers.

The sun thinned, the sky and landscape dimmed, and Venus shimmered into view below the sun. And then, two minutes before second contact, as the shadow was gathering...
in the northwest, people started to peep their car and bus horns and to set off firecrackers in earnest. And thus we greeted the moon's shadow as it thundereous over us and gave 104 glorious seconds of total eclipse: a spellbinding solar minimum corona with stubby polar brushes and long equatorial streamers ... a sizable ruby prominence ... beady dia-

mond rings fore and aft that lasted forever ... all attended by the sparkle of Venus and Mercury on either side, all in an eerie twilit sky.

And all the while, the surrealistic din of horns and firecrackers and excited voices continued unabated, until the corona faded and the shadow swept away and the edge of the sun peeped back into the sky once more. And it was thrilling. I'd never attended so noisy an eclipse before, and it added a wonderful dimension to the proceedings. Although the hubbub seemed more celebratory in tone, it took little imagination to project oneself back in time to when firecrackers and gongs and pots and pans were employed in the very serious work of discouraging such assaults on the sun.

Then, as the light returned and the moon slowly slid off the sun, the crowd began to disperse—but not before many of the students had us pose for pictures with their classmates. Mementos, perhaps, of the day they shared a common and singular experience with an unexpected group of people from far away.

I'll not forget the clamor of the Thais as the darkness descended and the corona blossomed in the sky. And neither will I forget the enjoyment of interacting with the students around us, making each others' experience more memorable with the serendipity of an unplanned moment.

I was impressed by the preparedness and interest of those students. And I think they were fortunate to have good teachers who understood the importance of taking advantage of uncommon events with which to engage their students. I recall reports from 1994 of some American kids who weren't so fortunate; whose school officials closeted them inside with the shades drawn during that year's annular eclipse—perhaps as much in fear of potential lawsuit if a student should look unguardedly at the sun as from a misunderstanding of the event. Such are the times in which we live.

But on that tapioca drying field near Khon Buri, those Thai kids had an enlightened opportunity to witness the workings of the universe first-hand, for their teachers knew that sometimes the best education is experienced rather than taught.

It will be 70 years before the moon's umbral shadow touches Thailand again; for many of those students, the eclipse was probably a once-in-a-lifetime experience. But I wonder how many of those students will have found it to have been a catalyst, the spark that ignites an interest in the sky or science, the impetus that may lead to a science or education career.

Just days after my return from Thailand, on November 1, I witnessed another educational experience in which students had a chance to actively participate in a singular event. This time, it involved the space shuttle.

The year before, our museum's work with the NASA Education Office in developing and presenting a teacher workshop led to an opportunity for local junior high school students to become involved in a live education session from the space shuttle on flight STS-73, with coordination and the satellite link provided by our museum staff and an on-site NASA education coordinator. After months of preparation and a month's delay in the shuttle launch, the big day arrived, and our museum auditorium was filled to the brim with students and teachers.

Prior to the start of the session, our staff gave sealable plastic bags filled with miniature marshmallows and M&M candies to each pair of students. They inflated the bags using straws, and then shook the bags to mix the contents. Then they were asked questions: Did the two kinds of "particles" stay evenly mixed or did they separate? Why? The students speculated on what might happen when the experiment was conducted in the "microgravity" of the space shuttle. If they expected a difference, why?

With some notions in hand, the students then watched as we established our video satellite link with the orbiting shuttle via the Johnson Space Center in Houston, and Mission Specialist Cady Coleman greeted the students and performed the same experiment on board the shuttle. Her marshmallows and M&Ms stayed pretty well mixed, and she suggested reasons for the difference between her results and theirs, relating the experiment to the work they were doing—learning how to grow perfect crystals in space without the complicating and separating effects of gravity.

Selected students then had a chance to ask astronaut Coleman their carefully considered questions relating to the experiment. (One of my favorites: how would you bake a cake in space? Remember you've got to mix the ingredients.)

Their part of the session completed, the students settled back while Coleman interacted with students in Las Cruces, New Mexico, whose experiment with heat packs again provided insight into crystal growth in space. And then the session concluded, the shuttle link dissolved back into the ether, and we began to rub the goosebumps off our arms. What a wonderful experience for these students to have had! Again, I wonder what
sparks of interest and motivation may have been ignited that day.

Another excellent example of direct-involvement education is the “Passport to Knowledge” series directed by Geoffrey Haines-Stiles, described as a series of “electronic field trips to scientific frontiers.” Last fall, Bill Gutsch, April Whitt, and others of our colleagues were involved in the “Live from the Stratosphere” program which featured the infrared studies of the Kuiper Airborne Observatory. This followed the earlier “Live from Antarctica” effort. And currently, students from the U.S., Germany, Japan, and other locales are involved in the “Live from the Hubble Space Telescope” project, again with Bill Gutsch’s and other colleagues’ participation.

This latest effort has been described as a cooperative effort between scientists and school kids. Three orbits of the Hubble Space Telescope have been set aside in March to conduct studies of one or more of four possible planets: Jupiter, Uranus, Neptune, or Pluto. The students have been able to communicate with projects scientists via the Internet to help choose the targets, and to help decide on what studies will be conducted of those targets. The observations are planned for mid-March (about as you read) and students will witness those observations live; in late April the results will be announced.

“Live from the Hubble Space Telescope” is a remarkable way to allow students to participate in real science with real scientists, and to become more familiar with how the process of science works. What a marvelous first-hand educational experience it represents! And in the future, “Live from Mars” waits in the wings for the launches, no doubt, of this year’s Mars-aimed spacecraft toward the Red Planet.

American educator and philosopher John Dewey, one of the pioneering advocates for learning-by-experience, is once said to have opined: “Education is not preparation for life; education is life itself.” I think these three examples illustrate, in a way, what Dewey was talking about. Whether witnessing an eclipse, chatting about microgravity with an orbiting astronaut, or discussing with a planetary scientist which planet we should observe and why, these students had the opportunity to temper their classroom perspectives with real-world experience.

Our profession lends itself to such experiences, and it’s important that we continue to take advantage of that. We may not all have eclipses or astronauts or Internet links with planetary scientists with which to work, but we all probably have space agencies or research institutions or nearby scientists we can tap. And not least of all, we certainly have the sky—the real one—where opportunities abound for making good use of astronomical and space events.

Long before John Dewey, Plato wrote: “The direction in which education starts a man will determine his future life.” And I think it’s still true today—for all of us. We must not underestimate our ability to influence the future lives of our students, and to include learning-by-experience in our arsenal of efforts. Like striking a flint to rock, who knows where the sparks will land—from both our carefully planned experiences, and those unplanned bits that add spice to life.

Report from the Council Meeting

Last October 13 (a Friday, no less), the IPS Council convened in San Diego for its annual meeting prior, to the start of the Association of Science and Technology Centers conference; special thanks to all of the Council members who attended and who made it a very productive meeting. Look for the complete minutes of the meeting to appear in the next issue. In the meantime, I offer some specific pieces of news of the meeting for your information.

Concerning IPS 2000: we have an embarrassment of riches in that we have received five first-rate bids to host our biennial conference in the year-before-the-turn-of-the-millennium. The inviting institutions are: the Planétarium de Montréal in Montréal, Quebec, Canada (Pierre Lacombe, Director), the Adler Planetarium in Chicago, Illinois, USA (Paul Knappenberger, President), the Calgary Centennial Planetarium of the Alberta Science Center, Calgary, Alberta, Canada (Bill Peters, Executive Director), the Planetarium de Morelia, Morelia, Michoacan, Mexico (Gabriel Muñoz, Director), and the Kelly SpaceVoyager Planetarium of Discovery Place, Charlotte, North Carolina, USA (Sue Griswold, Curator).

Each of the institutions supplied copies of their invitations to Council and most made presentations at the meeting in San Diego. And all have graciously agreed to write articles for this issue to present their invitations to the membership. I encourage you to read the proposals carefully and to participate in whatever mechanism your affiliate uses to decide how it will vote. The vote for the 2000 site will take place at the Council meeting in Osaka prior to the start of the 1996 conference.

We have five excellent choices; let your voice be heard. And special thanks to the five institutions for their willingness to host our lively bunch.

Incidentally, we’ve already received an inquiry about IPS 2002; it’s too early to begin thinking about hosting IPS in the first conference of the new millennium; proposals are due next year.

Concerning IPS ’96: Dr. Tadao Nakano and Mr. Singo Kawakami presented a detailed status report of the preparations for our upcoming conference in Osaka. It looks to be a good one, and I hope you will consider attending this first-ever conference in Asia with the potential for making
new contacts and having new and exciting experiences.

You should have received the official conference announcement providing details on the meeting and on registration, reservation, and paper proposal procedures. Our hosts have worked very hard to make the procedures as easy as possible for an international conference; note that tour agencies have been named to help coordinate your travel plans.

And please note also that, as of this writing at least, the exchange rate is 105 yen to the dollar; that's a significant improvement in the exchange rate since last year for international travelers to Japan, when the rate hovered around 85 yen to the dollar last May. It's costing less to travel to Japan, and I hope we will see many international delegates in Osaka as a result!

Concerning IPS 98: a report from Undine Concannon was read at the Council meeting; early summer dates from late June through early July are currently planned for the conference and post-conference tour. It looks to be another good one, hosted by the newly-refurbished London Planetarium, and we wish Undine and staff the best of luck with their planning.

Concerning affiliate reports: Council decided to reinstate annual affiliate reports, using a specific format to be developed by the secretary to serve as a guideline for reporting information.

Several affiliate representatives offered information on current activities, and Zinaida Sitkova, Russian Planetarium Association representative, presented a report on the current status of planetariums in Russia and the challenges they face.

Concerning Committees: in San Diego, Council reviewed the status of all IPS committees, a number of which are currently inactive. An amendment to the Standing Rules will be prepared for consideration at the Council meeting in Osaka to revise the Standing Rules to reflect the current status of committees.

The Language Committee, whose chair was vacant as of the Council meeting, is one of the inactive committees which will be revived—to consider the preparation of the IPS brochure in additional languages and other matters. A new committee has been established called the Outreach Committee (mentioned last time), chaired by Martin Ratcliffe; the committee's function will be to seek out and maintain contacts with other organizations for our mutual benefit. Another new committee to be formed is the Technology Committee, whose charge will be to serve as a clearing-house for information on existing and emerging technologies and to monitor current trends as they relate to planetariums. (Someone discussed this concept with me at the Cocoa conference, and, for the life of me, I can't remember who it was. If it was you, please get in touch with me.)

Over the next few months, I will be preparing a list of presently active committees, their chairs, and their current memberships, for publication in the next issue of the Planetarian. In the meantime, if you have a desire to work with any of the current committees that you may know of, contact the chair or one of the officers. There's usually always room to serve!

Concerning the Publications Committee: Undine Concannon's committee remains one of the busiest, with many irons in the fire. I'll mention just two. Council's consensus on the Special Effects Handbook was to reprint copies of the present handbook and update it with an addendum of new contributions, and to work with the Great Lakes Planetarium Association (GLPA) to see if we can also include items from its tips booklet. Concerning the planned IPS Resource Guidebook: rather than duplicate the fine publication of GLPA, Council suggested again that IPS consult with GLPA to see if we can arrange to have copies of its resource guide made available to IPS members, with a supplement to include additional resources and international entries.

Concerning the IPS Home Page: in another Publications Committee matter, Council directed the committee to begin work on an IPS Home Page for the World Wide Web. To this end, a Publications subcommittee has been established, consisting of Tom Hocking, Alan Gould, and Thomas Kraupe, to commence the effort. The objective is to establish a basic Home Page as soon as possible, with a status report and review by Council scheduled for the Osaka meeting. Look for reports on progress in the next issue, and on Dome-L.

Concerning the Elections Committee: Council accepted with regret the resignation of Chair Tom Stec, who has given long and faithful service to IPS. On behalf of the membership, I offer him our sincere thanks for the many years in which he coordinated and supervised our elections; it has been an oft-unheralded task, but one of the most important we conduct. Thanks, Tom, and best wishes.

I've appointed Steve Mitch, a committee veteran, to succeed Tom in this post. Among Steve's immediate efforts will be to fill vacant committee spots with an eye toward the international make-up of the committee, and to prepare for the upcoming fall election. Steve has called for nomination suggestions from the membership so that he and his committee can begin to assemble the slate of candidates which will be formally announced at the business meeting in Osaka. Please contact Steve and his committee with your suggestions.

Among Council's other actions was to approve several amendments to the elections procedures, including adding a provision that will allow the Committee Chair to report election results to Council.

Concerning amendments: a series of amendments to the Standing Rules were approved by Council; most were "housekeeping" amendments to update the Rules to reflect the present state of the Society. In addition, Council adopted new wording for IPS conference financial procedures to provide more guidelines for conference hosts and to better define IPS's oversight responsibility, and added wording concerning partial travel reimbursement for Council meetings during conference years to reflect current practice.

Additionally, three By-laws amendments were authorized by Council for placement on the fall election ballot; two are housekeeping measures, and the third proposes the elimination of the rarely-used Honorary Member category of membership.

Once the text of the Standing Rules is amended, the Rules will be republished through the Planetarian.

Concerning Astronomy Day: Council voted to become an official sponsor of Astronomy Day, joining 14 other respected organizations (based in the U.S. and around the world) in endorsing the event. Astronomy Day, first held in 1973, is a grass-roots effort to "bring astronomy to the people" according to the literature. There's a very good handbook by David Levy with contributions from Gary Tomlinson and Robert Horgan which offers a wide variety of suggestions for Astronomy Day activities; the handbook is free (except for postage and handling—$2 U.S. within the United States, $3 U.S. for places beyond) and is available through the Astronomical League in cooperation with Sky & Telescope magazine. The League and Sky & Telescope also sponsor awards for the best Astronomy Day event.

Astronomy Day this year is April 20, and is part of Astronomy Week which runs April 15-21. For more information, you may wish to contact Gary Tomlinson, Astronomy Day coordinator, at the Chaffee Planetarium, Public Museum of Grand Rapids, 272 Pearl Street NW, Grand Rapids, Michigan 49504 USA, telephone 616-456-3532, fax 616-456-3873.

It's a good program, and I encourage you to participate.
Concerning the minutes: this report is far from being exhaustive, so for a complete account of the meeting, be sure to check out Lee Ann Hennig's report on the minutes in the upcoming summer issue.

Planetarium News

It was not a good fall for large planetariums. For those who may not have heard, the McLaughlin Planetarium at the Royal Ontario Museum in Toronto, Canada was closed suddenly last November to address a museum budget reduction, according to museum officials. The ensuing public outcry was considerable—enough to cause Museum Director John McNell to issue a press release reaffirming the museum's commitment to astronomy education and indicating that the museum was exploring ways to "redevelop" the site to include a refurbished planetarium to "better meet the needs of a more visually demanding public." In the meantime, a planetarium educator will be kept on to provide astronomy courses and programs. But the planetarium remains closed. Our thoughts and best wishes go to Tom Clarke and his staff, most of which has dispersed.

Also last fall, Zinaida Sitkova reported that the Moscow Planetarium was closed, and there are rumors that it may reopen—as a nightclub. In both cases, the officers have written requested letters of support for these facilities with an encouragement for reconsideration.

Several times during the past year or so, I've also written requested letters of support for smaller school planetariums in the U.S. that were threatened with closure. Those facilities have fared better and have remained open—not because of my letters, but due to strong local support. These are difficult times for many. If you know of planetariums in trouble, and think that a letter from IPS officers will help more than hurt, get in touch with one of us. If requested by the planetarium staff, we're happy to do what we can.

On a brighter note, I also received word last fall from the Kuwait Science Club that it was about to inaugurate its new planetarium, housing a Spitz 512 projector under a ten-meter dome with seating for 70. The planetarium is attached to an exposition hall used for activities involving astronomy and space. The club is looking for publications, display materials, photographs, and models which cover scientific fields of endeavor, as well as information on educational programs and activities conducted by other planetariums. If you'd like to help out, contact Secretary General Abdullah H. Al-Mesbah at fax numbers (965) 5392578 or (965) 5396567.

News from Europe

If you have access to Dome-L, you've probably read notices about a new European planetarium network called EuroPlaNet. The initiative grew out of discussions at IPS '94 and in Europe, for the purpose of improving communication and cooperation among European planetariums including those of Eastern Europe. The network plans to work in alliance with the European Association for Astronomy Education (EAAE) and with IPS and the European IPS affiliate organizations.

A group of European planetarians met in Athens for discussions last November during the first major assembly of the EAAE, with the EuroPlaNet Home Page on the World Wide Web serving as the core of the initiative. The address is http://home.page.de/epln/. I've accessed the home page; it includes a statement of purpose and offers links to the home pages of a number of European planetariums, planetarium-related events and companies, and a variety of astronomy and space resources. Check it out whether you're European or not; there's much of value and interest here for everyone.

Concerning the EAAE, Thomas Kraupe has sent me a copy of its November newsletter, and it's loaded with EAAE business and a number of interesting astronomy and education articles. The organization also has a fledgling home page at http://obswww.unige.ch/EAAE.

Thomas also sent me a press release on the 1996 "Day of Planetaria" scheduled for March 24. This event has been held in Italy since 1990 and is spreading to other European countries; it provides an opportunity, similarly to Astronomy Day, to present astronomy to the public, but with special emphasis on promoting knowledge of and the spread of planetariums. I offer good wishes to all of the participants!

Finally, congratulations to all involved in the first European Meeting of Itinerant and Small Planetaria, held last October in Lumazzane, Italy—one of whose sponsors was the IPS Mobile Planetarium Committee. Consult Sue Reynolds' Mobile News Network column for a report on this important meeting.

Mount Wilson Summer Program

Dome-L recently (as I write) carried an announcement that applications were being accepted for the Consortium for Undergraduates Research and Education in Astronomy's (CUREA's) seventh annual summer program in astronomy and astrophysics, which runs August 7-20.

The program is open to undergraduate physics and astronomy majors with junior or senior standing who are considering a career in science or science teaching. Conducted at Mount Wilson Observatory near Los Angeles, California, the program is centered around a hands-on short course in astronomy and astrophysics with emphasis on "how our present understanding of the sun has been achieved and how it relates to the astrophysics of all stars." The program involves daytime use of the 24-inch Snow Horizontal Solar Telescope and day and night use of a number of other instruments including the 100-inch Hooker Telescope for the first time.

Sounds wonderful! The application deadline is April 12 and the tuition fee is $1,375 U.S. If you know people who may be eligible, you may wish to let them know. For further information and application materials, contact Joseph L. Snyder, CUREA Director, Department of Physics, Oberlin College, Oberlin, Ohio 44074 USA, telephone 216-772-833, e-mail jsnyder@alpha.cc.oberlin.edu.

Meeting-Time Survey

Please note the survey form printed on the following page in this issue of the Planetarian. The IPS Council wishes to review members' preferences for the time of our biennial meeting, and your input is important. Please photocopy and then fill out the form and return it to Keith Johnson by the May 1 deadline. It will take only a moment or two to fill it out; why not do it today?

Oops!

Last issue, I said that you'd find an issue of the Astronomical Society of the Pacific's "The Universe in the Classroom" included in your mailing envelope with the Planetarian. Because of a miscue at our mailing service, it didn't happen. Thanks go to John Mosley who took the mailers to task and made sure that the piece was mailed out shortly thereafter to all members. In future, you'll find "The Universe in the Classroom" included with your journal issue as promised whenever there's one to send.

Finally...

Don't forget to send in your registration for IPS '96, and if you have access to the World Wide Web, you might wish to check out the IPS '96 Home Page at http://www.beckkamee.or.jp/~goto-co/IPS96.html/ prepared by Tadashi Mori of Goto Optical Manufacturing Co. It offers useful information including links to some other Web sites. Dewa mata—see you soon!
IPS CONFERENCE MEETING-TIME SURVEY

The IPS Council has authorized a survey to review member preferences for the customary time of the biennial conference. What is your preferred month for the biennial meeting? Pick your first, second and third choices, write "1," "2" and "3" on the blank lines corresponding to those three choices, respond to the demographics questions, add any comments you wish to make, and return this form by mail or fax. The results will be reviewed by Council at its next meeting, and in a future issue of The Planetarian. Please reply by May 1, 1996.

January _______    July _______
February _______    August ______
March _______      September ______
April _______      October ______
May _______       November ______
June _______     December ______

My country is ___________________________________________.

My planetarium affiliation is with (check one):

___School     ___College/University   ___Museum/Science Center
___Observatory ___Other    ___Stand-Alone

My dome diameter is: ____________.

Comments or suggestions?

Mail or fax this form to Keith Johnson, IPS Treasurer, Fleischmann Planetarium, University of Nevada, Reno, Nevada 89557 USA, fax 702-784-4822.
Bishop Museum to arrange special pre/post IPS Conference tour of Mauna Kea and W.M. Keck Observatory

For those attending this Summer’s IPS convention in Japan, the Bishop Museum Planetarium in Honolulu is putting together a special tour of Mauna Kea. Although a date has not been selected yet, it will be decided as soon as interested IPS members contact the Bishop Museum with travel plans.

In addition to touring the summit of Mauna Kea, participants will visit the world’s largest optical telescope with a special guided tour of the 10M W.M. Keck Observatory. Special evening viewing sessions can also be arranged as well as the possibility of touring other observatories on the summit.

If you think you might be interested, please contact Peter Michaud at: (808) 848-4102 or e-mail him at: michaud@bishop.bishop.hawaii.org

Finally, if you want more information on this once in a lifetime opportunity, check out our new WWW site for planetarians only at: http://www.bishop.hawaii.org/bishop/planet/maunashow.html This site also has information (including sound bites and images) on Bishop Museum’s very popular new show called “ZerO-G Whiz”. This program is also available as a show kit to planetarians, contact us for more details.

Mount Wilson Summer Program for Undergraduates

The Consortium for Undergraduate Research and Education in Astronomy (CUREA) will offer for the seventh time its summer program in astronomy and astrophysics, August 7 through 20, 1996. Undergraduate physics and astronomy majors, with junior or senior standing, who are considering a career in science or science teaching are encouraged to apply.

Staff members and students will live and work on Mount Wilson, in the San Gabriel Mountains above Los Angeles. This site, renowned for its superb atmospheric conditions, is home to the historic 100-inch Hooker Telescope as well as many smaller telescopes now being used in frontier astronomical research.

The program will center around a short course in astronomy and astrophysics with a major hands-on component. The course will emphasize how our present understanding of the Sun has been achieved and how it relates to the astrophysics of all stars. Students will make intensive daytime use of the Snow Horizontal Solar Telescope (24-inch aperture and 60-foot focal length), with its associated powerful grating spectrograph; make both daytime and night-time observations of a wide variety of celestial objects using a 6-inch diffraction-limited refractor; carry out projects at both telescopes using visual, photographic and CCD detection techniques. For the first time we will observe with the 100-inch Hooker Telescope, and with a 24-inch computer-controlled reflector as well!

Additional activities will include: short presentations on important contemporary and historical astronomical topics; special lectures by distinguished astronomers; tours of research facilities on the mountain; field trips to nearby sites.

The application deadline is April 12, 1996. The tuition fee is $1375. This covers all expenses during the two-week program. Students are responsible for the cost of their transportation to Burbank, California. For further information and application materials, contact:

Prof. Joseph L. Snider, CUREA Director
Dept. of Physics
Oberlin College
Oberlin OH 44074
(216) 775-8335
fsnider@alpha.cc.oberlin.edu
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reviewed by John Mosley, Griffith Observatory, Los Angeles; jmosley@earthlink.net.

One of the essential astronomy reference works for skywatchers since 1983 is the authoritative Astronomical Tables of the Sun, Moon, and Planets. I use it so often that I have two copies—one at home and one at the office—and I keep both within easy reach. It's indispensable for looking up such basic and often-needed information as moon phases, equinoxes and solstices, dates and distances of perihelion and perigee, as well as information that is harder to find but sometimes wanted: equinoxes and solstices on Mars, dates of Saturn ring-plane crossings, dates of Easter, transits of Mercury, and the like. Some information is given for extended periods of time (oppositions of Mars from the years 0 to 3010, for example), but most of the more useful tables end at the year 2050 or even 2000.

Now this reference has been revised, and the second edition is improved in several ways. First, tables that ended in 2000 or 2005 in the 1st edition have generally been extended to 2020 or even later, dramatically extending their usefulness. There is no consistency, however, and in a few cases the table ends sooner than in the first edition. Some tables start with an earlier date, others with a later date. As examples, Earth in Perihelion covers 1980-2020, rather than 1960-2005; Sunspot activity is covered through 1994, as opposed to 1981; Oppositions of Saturn covers the years 0-2500 as opposed to 1960-2005; and Moon Phases covers 1970-2050 as opposed to 1951-2000.

Second, accuracy has been improved by using the latest ephemerides. In practice, changes from the first edition are small (moon phases times are adjusted by up to one second, for example), but it is comforting to know that the numbers can be trusted.

Third, the book is typeset, rather than typed, and has an improved visual appearance. It is now hardbound. It is also reduced in dimensions from 17 x 25 cm to 16 x 23 (1 x 7 inches to 9-1/4 x 6-1/4)—and the thickness is increased proportionately. I actually prefer the original dimensions because more text could be fit on one page and it was thinner.

And fourth, there are a few additional tables, such as Oppositions of Bright Minor Planets.

There are few flaws, but one is outstanding: the table of contents is horribly botched. This table is important because the book's contents have no meaningful order. The table in the first edition was bad enough in that section numbers were used rather than page numbers (there were no page numbers), but at least the contents were listed in detail and grouped in four consecutive pages at the front of the book and you could find what you wanted reasonably quickly. The second edition does have page numbers—but they are barely used—and the table of contents is two tiered. First you find the "Part" of the book you want (e.g. "Part 7: Other Tables," which begins on page 383) and then you must go to that Part's table of sub-contents to find the specific table you want, but when you do, tables are listed by Roman numeral only—page numbers aren't used. To make it worse, the Roman numeral appears only on the first page of each table. It's breath-taking in its awkwardness, and it defies all logic. That frustration aside, this is an essential reference I use daily, and I cannot image how anyone who needs to know what is happening in the solar system could live without it.

(What's New, continued from page 41)

written instructions along the lines of "look here" plus a single star chart with no instructions for use. And some of the concepts (and some of the activities) are too old for the lower end of the stated target of "ages 6 and up"—and this certainly includes the bibliography, which seems designed more for kids' parents than for kids. But there are some fun things to do. A good bit of parental permission and supervision is required—but in a way that's good; it makes the activities more of a family affair.

The Nightcraft Field Kit wholesales for $6 US.

If you're looking for space-related puzzles, check out the recent "Earth from Space" 550-piece beauty marketed by Replogle Globes, Inc., 2801 South 25th Ave., Broadview, Illinois 60153 USA, telephone 708-343-0900. It features that wonderful cloud-free view of Earth (in a Miller cylindrical projection) derived from the NOAA weather satellites. It's a great picture and a fun puzzle. I'll bet the ocean areas are pretty hard, but the image mercifully includes some actual ocean floor relief to help out. Wholesale cost is $6.50 U.S. for us.

Another space-related puzzle is the Triazzle, also marketed by the DaMart Company mentioned earlier. The triangular puzzle has triangular pieces of multiple art images of assorted planets, cut for maximum frustration. There are only 16 triangular pieces, but it's easy to see that it would be devilish getting them all put back right. On the back is useful information on the six objects displayed: Earth, Moon, Mars, Saturn, Jupiter, and comets, and a solar system diagram to show their locations. This puzzle looks unsettlingly like a flat Rubic's Cube; it wholesales for $6 U.S.

Finally, for a puzzle for the younger set, you might try one called the Educational Solar System Puzzle by Chadwick-Miller, Inc., 10 Pequot Park, P.O. Box S15, Canton, Massachusetts 02021 USA, telephone 617-828-8300. It's a colorful 21-piece puzzle actually made of thin plywood, and underneath the pieces lies information on the planets. The facts and figures may not mean much to the youngsters attracted to the puzzle (not recommended for children under three, it says), but as they grow older, they may. The wholesale price is $3.25 U.S.

Finally ...

All for now—except to remind you that another thing that's new is for IPS to meet in Asia, as it will for the first time this July. It will open the door to some wonderful possibilities; I hope you'll consider joining us in Osaka.

Have a good spring, depending on your hemisphere bias, and until next time—as they say in Japan—kawatta koto wa ari-masen ka—what's new?
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User-friendliness: no need to be a computer specialist to operate this system which uses a PC compatible computer as interface between the user and the calculator, associated to the Integral software developed on Windows.

You can therefore develop your own productions, simply using the trackball, the action menus and configuring the timing for each tool. You may also purchase existing productions, which are easy to implement, develop or modify.

RS Automation manufactures planetariums from 9 to 15 meters diameter, horizontal or inclined, and will, following your request, undertake overall implementation of a complete planetarium (including a spherical screen, floor and wall covering, seats, electricity, air conditioning...). Specific developments are also possible, such as planetary device elevating systems associated to a trap-door mechanism allowing use of the room for other purposes.
Jane's Corner

Jane Hastings
Thomas Jefferson Planetarium
4100 West Grace Street
Richmond, Virginia 23230
jhasting@pen.k12.va.us

In 1992, folks at the Space Telescope Institute were worried. Faulty equipment used to measure the curvature of the great mirror had resulted in an error while grinding that took off about the thickness of a piece of paper too much. The spherical aber­ration gave some of the Hubble instruments blurred vision. Even with the defect, Hubble gave better images of deep sky objects than any obtainable from Earth-based telescopes. However, newspaper articles about the Hubble Space Telescope were titled such things as “Hubble Trouble” and “Bad Dreams”. A cartoon appeared: caped and hooded Druids dressed in white were standing in a circle at Stonehenge with the caption, “Here are the scientists lining up for observing time on the telescope.” Stars seen through Hubble looked like squashed bugs. HST (Hubble Space Telescope) needed fixing. Solar panels and one of the cameras needed replacing, and HST needed “glasses” to correct its fuzzy vision.

A Space Shuttle mission to Hubble kept us glued to the TV while the astronauts fixed HST.

Hail to you, Hubble Space Telescope. You’re working again! I cannot open a newspaper or magazine without seeing your latest beautiful images. From your 1992 “PIGs in Space” (Partially Ionized Globules in the Orion nebula) to your recent “EGGs” (Evaporating Gaseous Globules in the Eagle nebula), you have tantalized, amazed and delighted the whole world with your discoveries.

Damn you, Hubble Space Telescope. You’re working too well! HST, could you please slow down a little? Don’t you realize that you are making life for us planetarians v-e-r-y difficult? As soon as I see “the latest” HST pictures and figure out how I’m going to include them in a planetarium show, you come along with new numbers for the Hubble constant or new facts about what is going on in the Universe, and my show becomes obsolete before it’s “out of the can!”

In my column of March 1990, I wondered if the old pre-Voyager Neptune information used in our planet shows could easily be replaced without having to re-tape the whole planet show. Neptune’s Great Dark Spot was something we had to put in our shows. According to you, HST, now the Great Dark Spot has disappeared and those of us who have put it in must take it out again. If we planetarians haven’t gotten around to putting it in our shows yet, and cringing each time Neptune appears, spot-less, in the show, be grateful for the procrastinators’ way of life. Thanks, HST.

Funny thing about microphones. I don’t need one to talk to students in my planetarium because we’re so close to each other (20-ft. dome). But a couple of times, when I had near-laryngitis, I used one. I then noticed an amazing thing: students respond to its voice more attentively than mine!

Gary D. Kratzer, editor of the STARLAB News, agrees. He writes, in the Fall, 1995 issue of that publication: “I have discovered an inexpensive way of dealing with excessive noise in my inflatable STARLAB planetarium. I bought a plastic toy microphone that reverberates when talked into. When my students are being a little too loud, I will announce into the microphone in a deep, powerful voice, ‘May I have your attention, please’. Remarkably, most of my students begin to call upon surrounding students to get quiet. It is as if a stranger has entered the dome and requested immediate attention. This works much better than trying to scream loudly to attract attention.”

What is it about microphones?

Overheard

-Michael Szesze, now a school administra­tor, was not popular with the school delivery man while Mike was a planetarian at Storer Planetarium in Prince Frederick, Maryland. The delivery man hated to bring packages to the planetarium because of all the strange items labeled on the boxes. He gingerly delivered such items as “Aurora”, “Meteor shower”, and “Lightning”, but called Mike excitedly one day: “You better come over here and get this one. I’m not touching it!” Mike went over to find a box labeled “Big Bang!”

-At a planetarium workshop presentation for astronomy activities, the presenter was saying: “Use an unbreakable globe over the light to be the sun”. John Flynn of Armagh Planetarium in Northern Ireland was heard to mutter under his breath: “Nothing is unbreakable in Northern Ireland”.

- Tom Gates, IPS president in 1976, over­heard two people in the lobby at Morrison Planetarium in the days when planetarium shows were basically lecturers doing star shows. Q: “What goes on in there [planetarium]?” A: “Oh, the sun goes down, then the sun comes up. It’s great!”

-Ken Perkins (retired planetarian), Sharon Parker (Buehler Planetarium in Davie, Florida), Gary Tomlinson (Chaffee Planetarium in Grand Rapids, Michigan), Dan Goins (planetarium in Martinsville, Indiana), and some other planetarians from the Great Lakes Planetarium Association (GLPA) went to the Conner Prairie Living Museum near Indianapolis during a GLPA conference in 1990. It was a farm setting of the 1800’s. People in costume were there in a cabin as interpreters. They stayed in character for the 1800’s as they talked to tourists. Costumed character: “We live here on the farm. What do you do to make a living in your community?” Gary (trying to stay in character for the 1800’s): “Well, let me see if I can explain this ...” Looking around in the 1800’s kitchen, he spotted a colander and a candle, burning. “May I borrow these to explain? My friends and I use something like this (turning colander upside-down and lifting it over his head) and this (putting candle under upside-down colander so that spots appeared on the ceiling of the cabin) to show stars to people.” Costumed character: “And you get paid for this?”☆

(Opening, continued from page 38)

Inna Filippova, of the Donetsk Planetarium in the Ukraine, tells us that her earliest recollection of the sky was “a picture from a folk story where a sky with stars was described. I lived in a small village where stars were bright, and colorful, and large.”

Her first visit to a planetarium wasn’t until after she had graduated from the university, but “this visit was a deciding factor in my career. The strongest memory: they gave me a job for all the following years!” Jupiter and the Andromeda Galaxy top Inna’s favorite telescopic objects list.

Inna’s best success was in “provoking my husband” into publishing his research on the solar system and the Titius-Bode Law, and her worst experiences have been with an old ZKP-1 projector, built in 1961, that has broken down during sky demonstrations.

Thanks, Vic and Inna, for your contributions. And if you haven’t sent your comments in, put ‘em in the mail, and I’ll try to use them in future columns.☆
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