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Journal of the Southeastern Planetarium Association

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Spring Issue (No. 1)	January 1	Fall Issue (No. 3)	July 1
Summer Issue (No. 2)	April 1	Winter Issue (No. 4)	October 1

Your cooperation will insure the continued timeliness of Southern Skies.

Southern skies

SOUTHEASTERN PLANETARIUM ASSOCIATION

Vol VI, No. 1 March, 1986

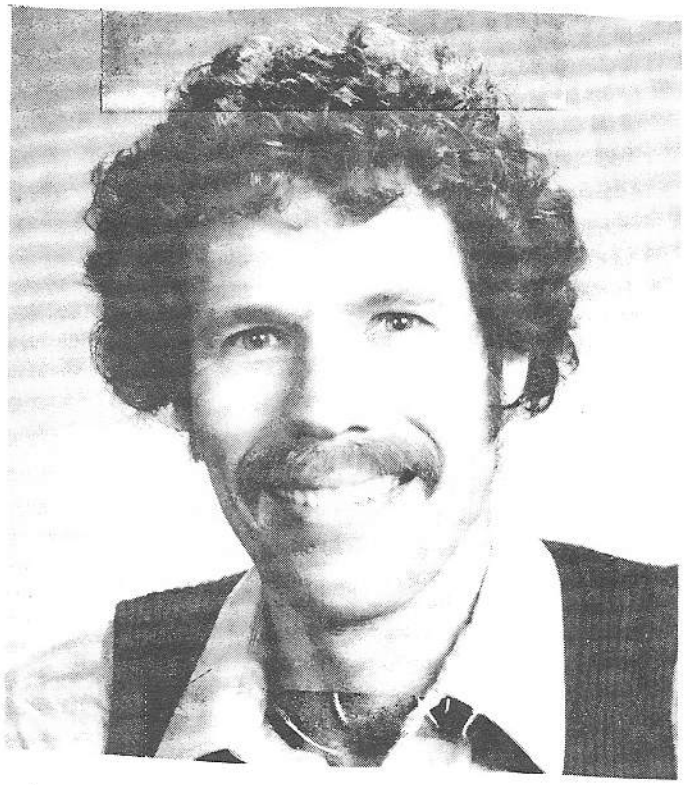
A Message From Your President

by John Hare

Well, Halley's Comet has finally arrived and all indications point to a better-than-predicted encounter. Our already overworked staff is busier then ever with additional school and public shows and a public observing schedule running six nights a week through December. The hoped for interest among the general public in our area, at least at this point in time, is nothing short of enthusiastic.

The whole business with the comet has posed two dilemmas. The initial one is that which we are now experiencing. How does a facility with limited staff and an already heavy program load accommodate the tremendous demand for information from the media, the schools, and the general public? From the standpoint of business principles you simply expand to meet the demand. From the standpoint of the typical planetarium you resign yourself to the fact that you'll be spending more time on the job than ever before over the course of the Fall, Winter and early Spring.

The other dilemma happens next Spring. The comet is gone and so are your audiences. How can you ever expect to match the attendance records you set and the revenue levels you achieved during the comet's visit? You have to call several times before you finally get through to



that reporter instead of returning his call when time permits. Justifying that parttime show operator or the equipment budget has once again become a major struggle. The list goes on and on.

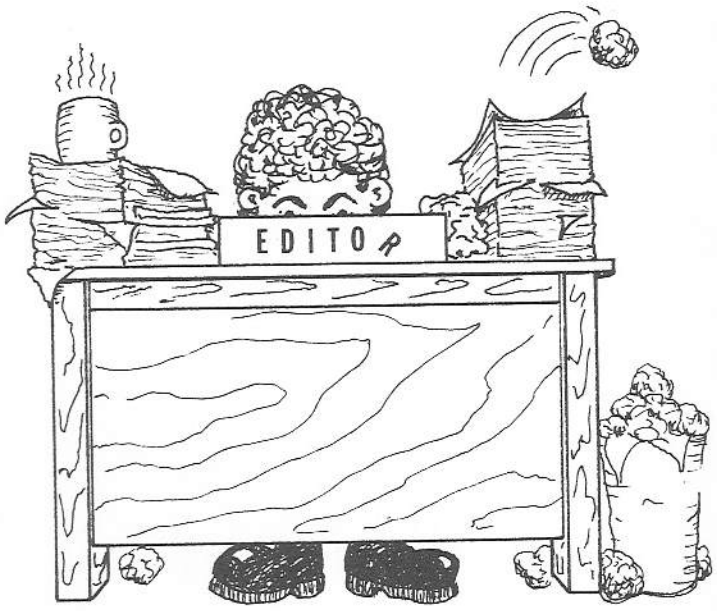
Despair not! Between now and next Spring we'll have the opportunity to reach more people and convey more information then every before; not only about Halley but myriad other things about astronomy and our facilities. Let's use this opportunity to make other aware of the important and interesting role planetariums play in the dissemination of scientific knowledge. Think ahead, and do something about it now!

Speaking of thinking ahead, several items of SEPA business loom on the horizon. Election of officers will take place at our 1986 conference. We will be voting for a President Elect and a Secretary/ Treasurer. The executive council has appointed Jane Geoghegan Hastings as Chairperson of the Nominating Committee. The Committee, consisting of Jane, Jim Hooks, and Ken Wilson, selected two well qualified candidates for the office of President Elect. Their biographical information appears elsewhere in this issue. Thus far only one person has agreed to run for Secretary-Treasurer; our incumbent, Sue Griswold. If you are interested in running for either office contact an officer or the Elections Committee before the conference.

As I'm sure you know, our 1986 Conference will be held at the Morehead Planetarium in Chapel Hill, North Carolina. The 1986 International Planetarium Society (IPS) Conference follows just two weeks later. Budget constraints will dictate that some can only attend one meeting. Regional meetings, by nature, are different from IPS meetings and tend to address the interests of the small and medium sized domes more so than do the international meetings. In recent years the SEPA Conferences have been acclaimed as being tremendously enlightening to all planetariums and have enjoyed significant participation both from our region and others. I'm sure 1986 will be no exception to this tradition.

This issue of the Journal, incidentally, is a double issue. We had been running behind for the past several issues and then, sometime before Christmas, a mailing from Tom Hocking (our Editor) to Kathy Summers (our assistant editor) GOT LOST. It was several weeks before anyone realized it and, with a subsequent deadline approaching, the decision was made to combine the next two issues and get back on schedule.

Happy Halley Watching!



Welcome to the combined Winter and Spring Issues of SOUTHERN SKIES. "Why the delays," you ask. My reply is, "Blame it on the Comet!" What else? I apologize for the lateness of the Winter Issue, but not for the on-timeness of the Spring Issue.

As you can tell by the address on the inside front cover, I have a new job. After working in a small facility (in fact, the smallest public planetarium in Louisiana), I am now seeing for myself how the other half lives. And you know what, it's not that much different...read my featured planetarium column and find out what I mean.

We now finally have word on the new and improved SEPA Conference for 1986. In this issue you should find all of the relevant information.

In the next issue of SOUTHERN SKIES I will try to sneak in some of the latest information on our new knowledge of Uranus, thanks to Voyager 2. As I write this I am anticipating going back to JPL for the Uranus encounter.

I hope that 1986 finds you well and prosperous, and that by year's end you can get a break from cometmania!

SEPA 1986

by Jim Manning

The staff of the Morehead Planetarium is looking forward to hosting the SEPA membership in Chapel Hill this summer for its annual conference. This seventeenth gathering of the faithful will cap an amazingly busy year for us all, and we hope to provide a bit of southern hospitality and relaxation along with all of the conferring.

Conference facilities and housing will be conveniently located on the campus of the University of North Carolina where the planetarium resides. Please note, however, that it has been necessary to change the conference dates from those previously announced. SEPA was originally slated to meed June 17-21; unfortunately, the university's housing office has informed us that it has become unable to fulfill its commitment to us on those dates due to construction delays. We have thus been forced to shift the conference to June 22-26 in order to provide adequate housing. We apologize for any inconvenience this may cause.

The theme of this year's gathering will be, quite simply, "Perceptions." We are largely in the business of perception, so there will be ample opportunity to discuss the crafts, techniques, and technologies of our profession. But we also hope there will be time for some useful self-examination. How are we perceived by the public, other educators, the scientific community? How do we perceive the public? Each other? Ourselves? And especially germane in 1986: how can we best aid the public's perception of the universe and how we study it, explore it, and function in it? This last question has become unexpectedly significant, perhaps, as we ponder not only the apparition of Halley's Comet and Voyager's triumph at Uranus, but also the tragic loss of the space shuttle Challenger and its crew.

The Morehead staff is busily at work on conference plans, and presently will be mailing further details to the SEPA membership. We hope to have both an enjoyable and thoughtful conference and hope you will join us in June!

An Invitation to SEPA Members

by Sue Griswold

Many of you will be travelling through Charlotte, N.C. as you drive to the 1986 SEPA Conference in Chapel Hill. I would like to invite you to spend a few hours, if your schedule permits, visiting the Charlotte Nature Museum and Kelly Planetarium and Discovery Place Science Museum.

The Kelly Planetarium features a Spitz A3P in a 24 ft. dome with circular bench seating for 60. Some of you may recall the SEPA Conference held here in the early 70's.

The Nature Museum houses exhibits designed to teach young children about the world of nature. Treehouses, the Sea Life Room, Earth Science Hall, and a new Live Animal Center are a few of our attractions.

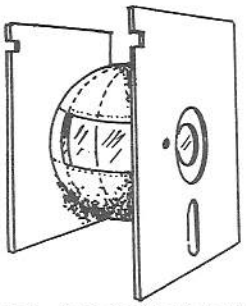
Discovery Place is a museum of science and technology that opened in downtown Charlotte in 1981. It offers a wealth of exciting hands-on exhibits including a Rainforest, Aquarium, Science Circus and Computer Center. A new addition to this museum will be completed by June '86.

If you would like to tour these museums, please contact me:

Write: Sue Griswold
Charlotte Nature Museum
1658 Sterling Rd.
Charlotte, NC 28209

or Call: (704) 372-6261 ext. 51.

I will send a map and arrange free admission.



THE DRIVING FORCE...A REVIEW OF ASTRONOMY COMPUTER PROGRAMS

Reviews by Duncan Teague
Craigmont Planetarium

ASTRONOMER
E. Arthur Brown Company
3404 Pawnee Drive
Alexandria, Minnesota 56308
48K Spectrum; $24.95

WARNING! REMOVE YOUR SOCKS BEFORE YOU USE THIS PROGRAM! If you don't, "ASTRONOMER" will surely knock them off.

The above disclaimer should be printed on the box from CP Software. Nothing else I've seen--and I've examined over thirty astronomy software programs for Apple, Commodore, IBM, and Timex/Sinclair computers--can match its features, the size of its data bank, and the accuracy of its calculations.

ASTRONOMER plots the positions of more than 1050 stars, the planets, the Sun, the Moon, the four largest asteroids, and two major comets, including Halley. Animated displays of the solar system show the relative positions and the movement of the planets. Position calculations, including equitorial coordinates and distance from Earth, can be displayed or printed. The latter two options can be employed for one date only or for a series of dates with any chosen time increment.

You enter local latitude and longitude, desired viewing date, and Greenwich Mean Time for an observation. A viewing date for a western hemisphere observer will be one day later in Greenwich for local times from about sunset to midnight. Once the stars and selected objects have had their positions calculated, their rising/setting times can be found, and 367 graphic displays of the sky are available.

Five "night sky views" show either a circular view of the sky centered on the zenith or a rectangular display centered on one of the cardinal directions. The "star atlas" contains 362 different star maps of a smaller portion of the sky. Each of these maps approximates a 35mm camera view of the sky with a display 30 degrees wide by 20 degrees high.

Stars of brighter magnitudes are represented by a larger number of screen pixels. Solar system objects are "crosses" added to or removed from the display by typing the first three letters of their names. To attract attention, they are flashed a few times as they are added or removed.

Constellations can also be plotted. The command "ALL" will outline every constellation or remove their outlines. Individual star patterns can be outlined or removed by typing a three letter code as specified in the instruction manual.

Night sky views, star atlas maps, animated solar system displays, and calculations of positions and rise/set times can all be copied to the T/s2040 or ZX81 32-column thermal printer. Full size printers are not supported.

The time taken to make all calculations after a change in location or time of observation is about ten minutes. At a rate of about 100 star position plots per minute, ASTRONOMER compares very favorably with similar Apple and IBM software.

Backyard astronomers and amateur skywatchers must be sure to take

appropriate precautions when using this program. Your feet may get cold when ASTRONOMER knocks your socks off.

ASTRONOMY UTILITY PROGRAMS
Laboratory Microsystems, Inc.
P. O. Box 10430
Marina Del Rey, California 90295
IBM & compatibles, $45.00; (Other versions available)

There are so many people offering computer products to aid in observing Comet Halley! How do you decide whose data for the position of the comet is the most accurate? How accurate do you need your position data to be?

Does it really matter whether the comet is calculated to be at 19:57 or at 19:59 degrees declination for an individual who's trying to catch a glimpse of Comet Halley in a pair of binoculars? Perhaps what you really need is software that's easy to use, performs quickly and accurately, and doesn't cost a week's pay.

Laboratory Microsystems, Inc has developed a cost effective and fairly well designed series of utility and special purpose astronomy programs for IBM compatibles. Three utilities are available to calculate your local sidereal time, convert right ascension and declination to altitude and azimuth, and interchange precession coordinates between the date of observation and epoch 2000.

The three utilities, cleverly called Utility 1, 2, and 3, also provide Julian date, Ephemeris and Greenwich sidereal time, hour angle, obliquity of the ecliptic, and ecliptic coordinates for those who need that information. The user just enters some combination of date, latitude, longitude, and Greenwich Mean Time for the desired calculation.

Also available is a Planets program and a Halley program which quickly calculate the equitorial coordinates of the major planets, the Sun, the Moon, and Comet Halley for a given date and time. Time must be entered as Greenwich Mean Time, so calculation will occasionally have to be requested for the date following the date of your intended observation.

The Utility programs cost $20.00; Halley, $20.00; and Planets, $25.00. The price is $45.00 for all three. They are accurate and very quick, and they run several times faster on an AT than they do on a regular PC.

What I did not like about them is that only one calculation can be performed each time the program is run. Making a series of calculations requires that the program name be constantly re-entered.

The promotional material from Laboratory Microsystems suggests that users of Z80, 6502, and 8086 based computers inquire whether a version is available for their machines. Technical support is available by mail and by telephone. The voice line is (213) 306-7412. A bulletin board for modem users is available at (213) 306-3530.

These Astronomy Utility Programs will help amateur and professional astronomers and astronomy educators find the positions of celestial objects and other observation data with speed and accuracy. They do not include any graphic displays. But that's what your planetarium is for.

SPACE SHUTTLE: A Journey Into Space
E. Arthur Brown Company
3404 Pawnee Drive
Alexandria, Minnesota 56308
48K Spectrum; $21.95

The sky changes from black to deep purple to red and finally to blue. The sun has risen, and now fluffy white clouds begin to drift across the early morning sky. In the distance you can almost hear birds calling each other to breakfast. You almost expect to small the distinctive odor of salt, sand, and sea.

It's the opening scene of Activision's "Space Shuttle" program, one of the most disappointing simulations I have ever seen. What makes the program so disappointing is the fact that only the demo version of the program will operate

correctly. The manual version of the program, the one in which the user serves as the pilot of the Space Shuttle, literally never gets off the ground.

Setup options allow the user to choose either keyboard controls or one of several Spectrum interfaces designed to allow joystick control of certain program functions. A handy keyboard overlay is provided to remind you which key opens or closes the cargo bay door, raises or lowers landing gear, fires or shuts down the engines, and the like.

The demo version takes the viewer through an ideal mission. The goal of the mission is to rendezvous with an orbiting satellite--which looks a lot like Skylab--and land at Edwards Air Force Base.

Dawn over Kennedy Space Center is followed by countdown, ignition, vibration, and launch. The Shuttle moves through the clouds, the sky changes color, and the stars appear. On screen reports tell you when maximum dynamic pressure is reached, when the Solid Rocket Boosters drop off, and when Shuttle is overheating because you forgot to open the cargo bay doors.

You catch up with, look at, and leave the vicinity of the orbiting satellite. So much for mission goals. Then you slow the Shuttle for re-entry. The sky glows red around you for some time, but finally, and rather abruptly, the dry lake bed and the mountains near Edwards Air Force Base appear.

At this point the programs looks like it should be called "Son of Flight Simulator." Soon you've landed. A few more missions like this one and they'll make a movie about you. But come back to Earth, this was just the demo version. Now you've got to fly it on your own.

Now come the disappointment and frustration. No matter how carefully you follow the instructions, no matter how closely your manually controlled engine throttle follows the computer calculated indicator, the only result you'll ever get is "Launch Scrub."

Back to the drawing board, Activision.

by Tom Hocking
The Louisiana Arts & Science Center
Planetarium
P. O. Box 3373
502 North Boulevard
Baton Rouge, Louisiana 70821

The L.A.S.C. Planetarium is the 5th largest planetarium in the South, and is the home of a Zeiss Mark IV projector in an 18.3 meter (60-foot) dome.

Originally opened in 1967, the L.A.S.C. Planetarium is a unique facility, located in one of the fastest-growing cities in the country.

The Louisiana Arts & Science Center is located in three buildings. The Riverside Museum is located in the former Illinois Central Railroad Passenger Terminal and contains an art museum, galleries, and a gift shop, a restaurant, as well as exhibit preparation space and the majority of the staff offices. The Old Governor's Mansion, which dates back to the time of Huey P. Long, has been preserved as an historic house museum and is opened to school groups and the public for tours. The Zeiss Planetarium, although constructed much later, is physically attached to the Old Governor's Mansion. This sometimes presents some logistical problems. The Riverside Museum and the Planetarium are City buildings, while the

Old Governor's Mansion is a State Property in which we are allowed to operate a museum. Hence there is a "no-man's land" between the two buildings where neither the city or the state want to repair anything that might break.

The planetarium consists of the planetarium chamber, staff offices, a laboratory, and a sales nook. That's right, restrooms aren't on the list! You have to climb a flight of stairs and go into the Mansion to answer Nature's Call!! Fortunately, access to THAT part of the Mansion is guaranteed as long as the Planetarium is open for business.

The L.A.S.C. Planetarium currently has a full-time staff of two co-equal Planetarium Curators who oversee all of the administrative and production phases of the operation. In addition, there are also a few part-time staff who assist with the sales nook and occasionally with public programs. There are also a few volunteers who round out the staffing here at the Planetarium.

Show presentation is done using a taped format for all shows. Our two main carousel projectors have been automated using an AVL programmer which places computer signals on the show tape. We intend to automate our remaining carousels in the near future.

We have just recently installed a 24-hour Sky and Program Information number for interested patrons to call: (504) 344-0535. It has proven to be very popular.

Public shows are offered every Sat. and Sunday at 2 and 3 in the afternoon. During the months of June through August, public shows are also given Tuesdays through Fridays at 2 pm. During the School year, educational programs are presented Tuesdays through Fridays at 10 am, 11:15 am, and 1 pm. Annual attendance is approximately 40,000 with 60% of that being school programs.

Five different school programs are offered: K, Primary, Intermediate, High School, and an additional Constellation Show which is useful for all ages.

If you happen to pass through Baton Rouge in the near future, please stop by and say "Howdy!"

Tom Hocking and Sam Mims
Planetarium Curators

by Richard McColman
Gibbes Planetarium

Light is the single most important commodity available to the planetarium. Regardless of whether you're using Carousels, homemade special effects, or the star projector, the space theater becomes totally ineffective without the controlled use of light.

No doubt, all of us would agree that smooth, subtle fade-ins and fade-outs beat the heck out of simply throwing a switch on and off. Yet A.C. dimmers, as simple as they seem to electronics engineers, can thoroughly baffle the small planetarian whose background is in astronomy or science education. Lord help those who try to wade through the endless, mindboggling terminology of the technician! As helpful as they try to be, some of our fellow SEPA technical friends will inevitably "lose" many of us "small-talkers."

With this dilemma in mind, let's take a step toward understanding, in layman's terms, the construction of this most widely used of all electronic devices for the planetarium--the A.C. dimmer.

As a precaution, remember to be careful, as these dimmers handle 120-volt "house current." Also, if you want to build or repair dimmers on your own, make sure to bone-up on soldering techniques, as overheating components with a soldering iron can stop you dead in your tracks.

We mount dimmer parts on perforated circuit board, and run wires and leads through the holes, joining and soldering them on the backside. This "perf-board" and the electronic components can be purchased from a well-stocked electronics parts supply house. (Radio* DOESN'T carry all the parts you'll need.)

To get familiar with dimmers, go buy a standard rotary wall dimmer from K-Mart or the hardware store, and disassemble the case, (usually by drilling out the rivets). Inside you'll see several components--the key part being the "TRIAC." It's the 3/8-inch-square plastic chip (gray, brown or black) fastened to the dimmer's faceplate via the chip's metal tab, and it also has three leads sticking out of the bottom. This triac is actually what dims the lamp (with help from the other parts, of course). Along with the triac you'll find a little orange or mud-colored "gum-drop"--the CAPACITOR--and a squat cylinder fastened to the faceplate--the POTENTIOMETER (POT), or volume control.

Along with these components, you may find a small brown cylinder with a lead sticking out from each end and four colored bands--a RESISTOR, as well as a small glass cylinder with a tan color inside and a wire at each end--the DIAC.

Commercial wall dimmers also contain an extra capacitor and a coil of wire with an iron rod in the center. Together, these two parts filter out radio noise that would otherwise be transmitted by the dimmer, messing up radio reception nearby. Therefore, these two components are usually omitted from most planetarium applications.

The dimmer, by the way, hooks into an A.C. line in the same manner as a switch (see Fig. 1).

* I think it's supposed to be RadioShack. — Ed.

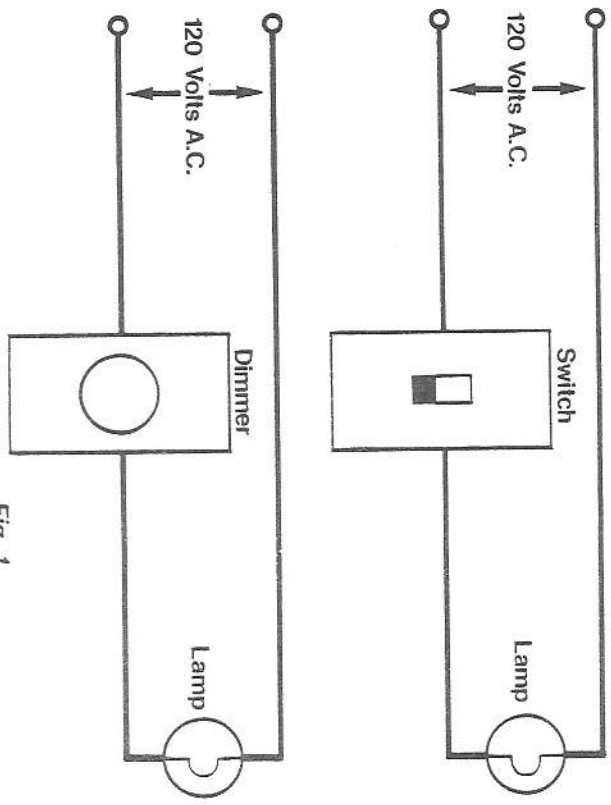


Fig. 1

Now, do a little experimentation with this basic dimmer or for convenience, one already installed in your home or a neighbor's. (You will already have noticed that the wall dimmer has a switch built in, a feature usually omitted in planetarium circuits.)

First, switch the dimmer ON, but turn it all the way down. Now, slowly turn the knob up--while watching the dimming action of the lamp fixture. You'll notice that dimming-down is smooth all the way. But when you start at the "bottom" and dim-up, the lamp seems to 'snap on"--a rather annoying characteristic when used in the planetarium.

We can, however, eliminate this snap-on by simply adding three components--a resistor, and two diodes.

Now, you can either build a dimmer from scratch, or modify a store-bought unit, if you choose, but to begin with, let's figure out what each component does.

1) The triac actually controls electrical flow through the lamp. However, rather

than reducing the volume, or "amplitude," of the A.C. waveform (like an autotransformer), it actually switches on and off a precise points along the wave (see Fig. 2). That's what causes the lamp filament to "sing" during dimming. For most applications, use a triac rated at 200-400 volts and at least 10 amps.

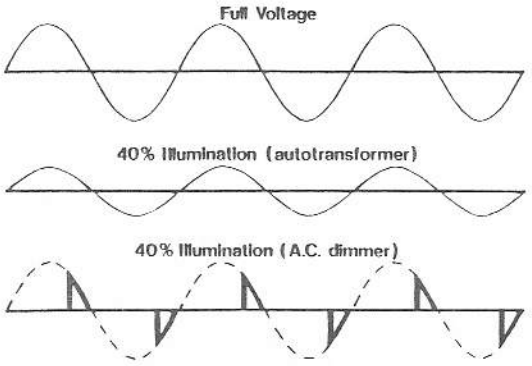


Fig. 2

Don't mistake components you've seen in other circuits for the triac. Many other parts, such as SCR's, voltage regulators, and power transistors, look the same--BUT AREN'T! Go by the part number for identification.

2) The diac acts as a trigger which fires the triac at the precise point in each wave. Some dimmers can do without this component, but ONLY if the triac has an "internal diac." This can be determined from an electronics parts catalog (ECG, Motorola, etc.). Most diacs on the market will work in your circuit, as they are intended for just this purpose.

3) The capacitor is a device that stores an electrical charge. In this case, the capacitor determines the point at which the diac fires the triac. The charge capacity of a capacitor is rated in "microfarads" (" F" or "MFD"). For the dimmer circuit, use a "metal film" capacitor rated at 0.1 F, and a minimum of 200 volts.

4) A resistor does just what the name implies--it resists current flow by a specific amount. The resistance is measured in "ohms" (Ω). Choose a value of 15K (15,000 ohms) and 1 watt for our "anti-snap-on" modification.

5) A diode allows electrical flow in only one direction. In appearance, it resembles a resistor, but it usually solid black or gray, with a white or silver band at one end. In this circuit, our two diodes together with the 15K resistor eliminate the snap-on characteristic. Choose diodes rated for at least 200 volts and 1 amp.

6) A potentiometer is a resistor whose value can be varied. It has three leads, although we'll use only two--the center and the left (as seen from the "shaft side"). The pot is what the dimmer knob turns, varying the resistance. Ask for a 250K "linear-taper, panel-mount" pot.

For clarity, Figure 3 shows an "exploded view" of the assembled circuit. Of course, you'll want to mount yours on the perf-board, with the solder joints on the reverse side to hold the components and prevent shorting. Although each end of the resistor, the capacitor, and the diac are interchangeable, pay special attention wiring up the other parts, as these can only be hooked up one way.

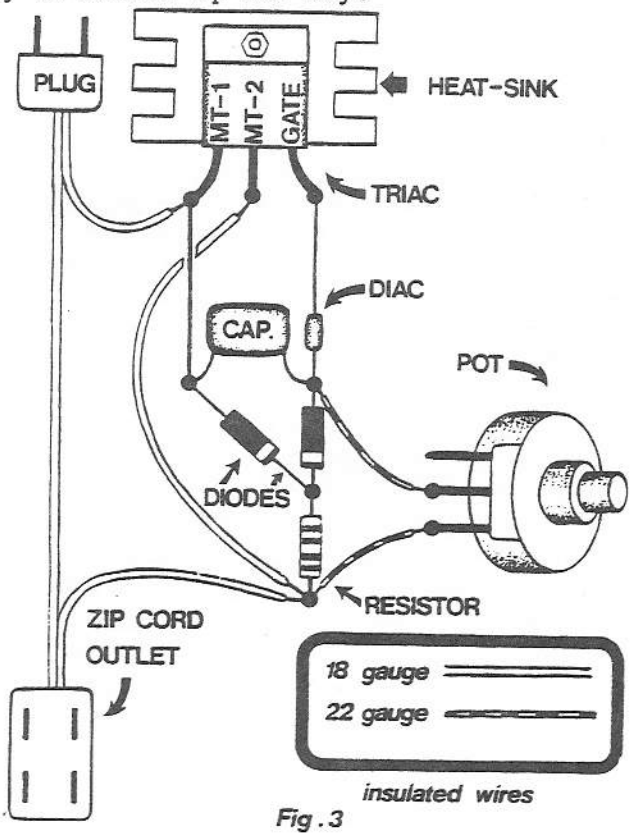


Fig. 3

Take note of the orientation of the band on the diode. On the triac, MT-1 and MT-2 handle the lamp current, while the GATE (G) is the control lead for the triac itself.

Since the triac generates high heat levels, you must attach a "heat-sink" to the metal back with a small machine screw and nut. Also, dab a small drop of "heat-sink compound" on the back of the triac (but be careful not to get any on the leads, or you'll cause a short) before attaching the heat-sink.

For those who wish to use this dimmer on a Carousel or Ektagraphic, delete the plug, outlet, and unbroken zipcord conductor and connect each of the wires from MT-1 and MT-2 (stubbed off from the 15K resistor in the diagram) to the lamp-dimmer wires on a Carousel 7-pin plug.

Also mount the circuit in a small project box with the power and pot wires running out, or inside the console--making sure to attach it so that it can't short-out against any pieces of metal. The pot can be mounted on the control panel.

But remember, before you get started, find out how to solder properly, or all your effort may go down the drain.

SMALL TALK - Part 2

Mounting slides is, no doubt, widely viewed as perhaps the most dull and non-creative chore faced in show preparation. Perhaps it is for this reason that many of us give little or no consideration to slide mounts except for the purchase price and time required to "do the dirty work." Besides, why spend a bundle in time and cash if it's not really necessary?

At this point, my memory takes me back to last summer's SEPA conference when, under LBL's 40-foot dome, we watched several hours of planetarium productions. For the life of me, I am unable to recall more than a scant few seconds of focused images emanating from the projectors. And therein lies the problem.

The solution is the glass mount. Glass mounts circumvent the problem of film "pop" due to increased temperature in the slide gate. This is accomplished by simply "sandwiching" the film between two pieces of glass, thereby creating a "focus constant." It used to be that glass mounts were clumsy and difficult to use. In recent years, however, product refinements have created mounts that are nearly as convenient as their cheap-plastic counterparts.

Too expensive, you say?

My response is, "Does your audience deserve less?"

After hours of production time, or at the very least, a couple of hundred smackers for a canned presentation, why doom an otherwise decent show to mediocrity because the visuals keep fading off into mush? Further still, why even bother to focus the projector or camera to start with?

Okay, now that that's off my chest, let's sort out just what IS so great about these little silicate wonders.

If you have auto-focus projectors exclusively, you may have only minor problems with slide "pop" or "buckle." However, auto-focus mechanisms aren't particularly reliable, especially in older projectors, and remote focus at the console during a hundred-plus slide show can be murder on your sanity. Multi-image producers don't rely on either of these devices and, in my opinion, neither should you.

There are other advantages to glass mounts, though. In fact, an upgrade to glass can open up a whole new world of imaging possibilities.

Ever wanted to show the earth magically swimming in the starfield rather than that rectangular slide format? It's easy! Just shoot a variety of Kodalith circle masks (clear disk with black surround) from your own graphic (black disk on white paper), then sandwich the right mask with your earth slide, tape each into the mount, assemble and MAGIC! (If in doubt,

choose a circle slightly smaller rather than larger.)

You can achieve the same effect with irregular objects (a comet nucleus, for example) by using Kodak "Opaque Black" or "Opaque Red"--thick, fast-drying paints designed for just this application. After mounting the slide, brush the opaque directly onto the outside of the glass insert(s) (front, back, or both) with a "triple-zero" (000) artists brush (we prefer the Opaque Red because it's easier to check your coverage). Cover up to, but not over, the edges of the image. Use a lupe, and with a little practice you can get very proficient at opaquing.

You can even combine two or more images in the mounting process by simply cutting frames down to insert, say, an earth and a moon together--taping them down with their respective masks. Of course, you'll likely end up with clear sections that have no film at all. Use either opaque on the glass or aluminized slide masking tape inside the mount or a combination of the two to finish the job.

Various self-adhesive colored gels are also available which, with patience, can allow multi-colored graphics on Kodalith titles, etc. (We use CHARTPAK tape which is available from graphics arts shops.) Numerous other techniques can be employed, whose variety is limited only by your imagination.

Glass mounts come in two basic types--WITH pin-registration and WITHOUT. Unless you have an Oxberry copy system or a Nikon with a $2000 pin-registration modification, get the latter style.

Several companies offer glass mounts, each with a somewhat different design. The GEPE and WESS mounts are perhaps the easiest to use, and each can be disassembled repeatedly without destroying the mount. GEPE's are distributed through professional camera stores; WESS mounts must be ordered directly. The address is:

Wess Plastics, Inc.
50 Schmitt Blvd.
Farmingdale, NY 11735
(516) 293-8994

Whatever mount you choose, stick with that one consistently, as focus between different types can vary.

Also, before buying glass mounts, watch out for tray compatibility. GEPE non-registered mounts are perhaps the thinnest, and can be used successfully with any Carousel-style tray (except for the 140's), whereas others may require EKTAGRAPHIC trays which have wider slots.

Remember, glass mounts ARE more expensive than plastic or cardboard--averaging between 15 and 30 cents apiece. But the benefits in focus stability and compositional flexibility far outweigh the costs.

As always, drop us a line for further questions, comments or suggestions. Oh, and let us know your ideas on SMALL planetarium workshop topics you want to see incorporated in the 1986 SEPA conference at Morehead.

Richard McColman
Gibbes Planetarium
1112 Bull Street
Columbia, SC 29210
(803) 799-2810

STARGEEZERS

by Kris McCall
Alexander Brest Planetarium
Jacksonville, FL

THE PROCESS

Halley's Comet. It's only December and I'm already sick to death of it! Probably the most significant event to occur this far in planetarium history, it has a fair lead over total eclipses of the sun and the introduction of laser light shows.

I didn't even know about the blurb in the local paper until the phone rang and a little old lady spent five minutes telling about her experiences during Halley's Comet in 1910 and thirty minutes about all her ailments, what she ate for lunch, her children, grandchildren, and great-

grandchildren, and everything that is not right with the world today.

Philip Groce opened Pandora's Box when "he" decided that "we" would interview people who saw the comet in 1910 as part of our comet program. After about three weeks we had received four dozen calls, and I thought that would be the end of it. For some reason the paper ran the announcement again that we were still looking for people. Then someone got the "brilliant" idea to contact all the nursing homes in the area. After another three weeks, the final result was a mailing list with 150 names on it.

One might think that the most difficult part would be recording the interviews. In addition to audio recording, each person was photographed. As many as possible came to the sound studio at the planetarium to be part of our little project. However, there many others who were not able to come to us, so we had to go to them. Special thanks goes to Mike Hutton at the Brevard Community College Planetarium in Cocoa, Florida, for locating a Nagra remote recorder for the job. Without that, this task would have been impossible. At one nursing home alone there were twenty-five second-timers. All in all, about four weeks were spend just gathering the raw material. Some of the people were great, and some were just barely there. When all was said and done, there were twenty rolls of film and seven hours of interviews, and we only talked to eighty people. One just has to draw the line somewhere.

Then came the task of choosing suitable comments. The sound bytes were to be used for walk-in, walk-out, and the last segment of our comet program for a grand total of only eight minutes. All the interviews were transcribed resulting in 140 pages of written material. I wanted to use at least one statement from each person, but it was impossible. Most people had one or two good line, while there were a few who had lots of good things to say, and others were no help at all.

All remarks under consideration were transferred to index cards to make editing easier. They could be put into any order, moved around easily, or thrown out entirely. Even then it was still tough to make decisions because there were so many good stories. I tried to put together a variety of representative statements. Everything was worked out on paper before any tape was cut. Actually, dubs were made of selected comments so the original tape remained intact. A few changes were made after all the pieces had been assembled and edited; mostly to cut down on the overall length. After all my efforts to be efficient, I still lost track of exactly how long the whole process took.

THE STORIES

At this point in time the comet itself isn't much to look at, so I found this job pretty interesting. There were days when I could just scream if I had to talk to another one of the old folks. Yet after all the trouble they caused, I still think of most of the stargeezers fondly. I'm not sure who coined the term "stargeezer," but it does seem appropriate.

We asked four basic questions: 1) What did the comet look like to you? Where were you when you saw it? What time was it? How old were you? Who did you see it with? 2) What were your feeling about the comet at that time? Were you afraid or impressed? What did the rest of your family think? 3) Do you recall any stories or events related to the comet? What did the paper have to say? What did your neighbors or other citizens feel or say about it? 4) If you were talking to a youngster today, what would you tell him about the comet? Is it worth going out to see? How do you feel about having the opportunity to see it again?

We spoke to people who saw the comet in Spain, Australia, Brooklyn, New York, downtown Jacksonville, Florida, and rural Georgia. There was even a young man who was the son of a sea captain and on board a ship in the South Pacific when he saw the comet stretch from one horizon to the other. The woman from Spain sang a song about El Cometa Halley.

In 1910, they ranged in age from three to twenty-one years old. Most people saw it with their families, and the majority got up in the wee hours of the morning to see the comet even though it was an evening object as well.

To most people the comet was white, while other saw it as red. It ranged in size from "about as big as a washpan" to stretching halfway across the sky. One man described it as a star that leaked or an eyedrop turned sideways, while another asked why comet pictures are always horizontal when Halley's Comet appeared vertically in the sky with its tail touching the horizon. The most intriguing physical description was that many people recall the comet going "whoosh" across the sky. Few could describe its motion correctly, and only one man saw it as a predawn object and then in the evening several days later. One woman most vividly remembers the fact that it did not move because she fully expected it to go "whoosh." Then there was the old man who described "the big wind that blew trees and buildings down." At that point I turned off the tape recorder.

Probably the story that fascinated me the most was that of a blind woman who said that her teacher had made a braille model of the comet so they could know what it looked like up there in the sky. There was another lady who said that they actually had an argument about whether it was pronounced Hailey or Halley.

There were several people who didn't get to see the comet at all even though they looked diligently for it. Mrs. Enid Clarke didn't get to see it either because she had the measles at the time. Going out would make them worse, and she must have been pretty sick because she didn't even sneak to the window when alone in the room. She describes it as "the biggest disappointment of my life," but hastily admits that if she had gone out then she might not be here today so that it was worth the wait.

"Seventy-six years is a long time to remember anything." Because of the wee hours when awakened to view the comet, most were more interested in getting back to bed than paying attention to what was going on in the sky. Many were told to "look carefully and remember because you may live to see it again," but most of these people never thought they would live long enough even though told that it would return during their lifetime. That one fact was stressed so heavily that maybe it is that impression that is responsible for the fond and vivid memories these stargeezers look back upon today.

One girl had a grandfather who remembered its appearance in 1835. Other got their information about the comet from the local paper or through other people. We all know how a story can be grossly altered when passed from one person to another.

Then there was the country boy who was driving a blind man to meet the late train on the very night the world was to be destroyed. He said that he "snuffled and shed tears because he wouldn't never see his parents no more, and that was a pretty hard thing for a boy who was only eleven years old."

There was another lady who was walking home one evening and had to pass by the cemetery. She always felt jittery about doing that, but this night was special. She happened to look up and saw this great star with the long tail to it. "Well, I had never seen anything like it, and I had never heard of Halley's Comet, and I thought it was a ghost flying around up there. It frightened me so much that I ran all the way home, and that is the way I remember seeing Halley's Comet."

Not everyone was scared though. "It was beautiful, perfectly beautiful." Many described it as the greatest thing they had ever seen. One girl thought it was heaven while another said that it was something the angels had concocted just for her.

Most of the "children" who saw the comet in 1910 were not afraid of the sight itself. It was the stories they heard that brought fear into the picture. Astronomers had discovered that the tail of the comet contained cyanide gas and that the earth was going to pass through the tail. People were not as educated as

they are now, but they did know that cyanide was a deadly poison. All these "facts" combined spelled certain death for those who didn't take the necessary precautions and even possibly the end of the world.

Just as today, there were con artists in 1910. They had a field day and made a fortune selling the now-famous comet pills until they got chased out of town and moved along to another. Gas masks were another popular item, as was comet insurance. The "salesman" would take every dime you had and leaving you holding a piece of paper. Most suckers neglected to read the fine print where it said that one had to die as a direct result of Halley's Comet to collect any money.

Comets have been seen as bad omens for centuries; 1910 was no exception. "It was predicted there would be war, and really not long after that we had World War I."

Then there was the imminent end of the world. Some people didn't plant new gardens or make new clothes. Others gave everything they had to charity anticipating that they would have no further use for it. I'm not quite sure what they did in 1911 when nothing happened. While some unfortunate souls committed suicide, others dressed for the occasion in their Sunday best ready to be buried on the day the earth was to pass through the comet's tail.

They had to add extra pews in some of the churches to make room for all the converts. There was one recollection of a group of people standing on a hilltop singing and praying. One little boy lived in the predominately Irish neighborhood of Brooklyn. The children ran up and down the block yelling "The comet, the comet, everyone come out and see the comet." The family next door came out and dropped to their knees on the sidewalk praying fervently with their hands outstretched toward the sky.

No offense intended, but there were several stories about hired hands or blacks in the community and how they responded to the threat of the comet. Everyone was scared; both black and white.

"The superstitious people thought the world was gonna come to an end, and they believed that sincerely. A bunch of them built a little shed with a roof on it and a board floor, and they had what they called 'sanctified meetings' there every night from about dark to way late. This is before the comet tail passes the earth because they wanted to get right with God before the comet hit. Well, it was quite amusing. They shouted and danced and hopped and prayed and sang, and when they got winded out, why they'd get over another group to come along and do the same thing."

There was another man who believed that if he jumped off the top of his chicken coop at a particular time on a particular day that he would not fall to the ground, but instead the tail of the comet would carry him up into the air. The whole community gathered when the appointed time arrived. The man leaped from the roof of the chicken coop, and all that he got for his sincere belief was a broken leg.

After hearing all these stories, it seems that half were scared of the comet while the other half were in awe of it. Many were thankful that their parents had been interested enough and went to the trouble to get them up to see the Comet.

"It definitely is worth the trouble of going out to see." "I think they should forget everything else and see it, because it's a memory that you will carry all of your life." "If anyone had asked me, 'What's the prettiest think you've every seen?' i'd have to say Halley's Comet." Several wished they had paid more attention to the event, and are eagerly awaiting the chance to see it again. "I wonder if it will look the same as it did in 1910." "I kept telling my doctor to keep me alive till after the comet came 'cause I wanted to see it one more time." "I remember my parents telling me, 'If you be a good boy, you'll live to see it again.' So I've been telling that story for years hoping that I was good enough to live to see it again."

AFTERWARD

COMET FEVER, which is an updated version of a Brest Planetarium production called IN SEARCH OF A COMET, opened on October 12th, 1985. For the premier of the show we had a party for the stargeezers. About three hundred people came, and we had to give two shows to accommodate all of them.

It was touching to see them swap stories with people they had never met before simply because they had this one experience in common. There were a couple of second timers who I didn't think would be able to make the trip or stay for the show. I was surprised to see how many came and how much they enjoyed it.

Perhaps we can learn something from all these stories of what the world was like in 1910. For these people, the appearance of Halley's Comet is a memory they have carried all their lives. "I wouldn't miss it for anything," was an often heard statement.

So often the elderly are forgotten. On this occasion they were guests of honor. They were thrilled that we had taken the time to interview them and include them in our observance of Halley's Comet in 1985. After all that work, their smiles made it all worthwhile.

I'll be 100 years old when the comet comes back in 2061. I'm already rehearsing what I will say when asked about the 1985 appearance of Halley's Comet. It was an interesting task to work with the survivors of the comet's 1910 visit. I only hope that the comet will be as impressive and colorful as these people I have met in the last six months that I affectionately call STARGEEZERS.

The DORK System

by Robert C. Tate
Harper Planetarium

Operating a one-man planetarium means that everything takes more time than seems necessary, but when you have to do everything by yourself, some wheels squeek louder than others. But some problems persist, even though they don't squeek real loud. One such problem in my planetarium has been projector control.

When the Harper Planetarium was designed and built in the early 1970's, it was decided (by Spitz Laboratories and the purchasing department of the school system) that the standard configuration A-4 RPY instrument with two Carousel circuits and two special effects circuits would be sufficient to educate all the students who would ever come to the planetarium. While the Carousel circuits were designed well, the special effects circuits ran on 24 volts a.c. for motors and lamps and are worthless for running most special effects. To make matters worse, there were no free 120 volt outlets within twenty feet of the console and none in the cove. Thus started my odyssey in search of the perfect control system for my planetarium.

Working within budget, and with commercially available equipment (two conflicting constraints) produced an intermediate solution, which got me by for a few years and taught me a lot about control systems. This intermediate solution consisted of 1) having more 120 volt outlets installed at strategic locations in the planetarium, 2) adding a couple of two-projector tape-driven Carousel dissolve units, and 3) building a special-effects board which had been designed by Forrest Wilson of the Fernbank Planetarium. As a part of this special effects panel, several Carousel control circuits were also installed, along with controls for a home-made horizon system. Dimmers for this system were built using components designed by Joe Hopkins and described in his Southern Skies article "The Universal A.C. Switching Module."

The special effects panel met all my needs, but the dissolve units taught me that using any control system which places control signals onto a blank channel of your audio tape is very difficult to edit. In addition, the difficulty of programming such a system increases as the fourth power of the number of projectors in use. Thus programming four projectors is

sixteen times more difficult than programming two projectors.

The need for an easily programmed and easily editable system was obvious. A check around SEPA land showed that a very promising system was at that very instant under development by Mike Hutton and Jon Frantz at the Brevard Community College Planetarium in Cocoa, Florida. After extensive talks with Mike and Jon, I decided to install their control system in my planetarium.

The system consists of several inter-connected pieces of "hardware" and the software to run it all. The hardware consists of the following:

1) An Apple][(or //e) computer in which is installed an . . .

2) INTERFACE CARD which is connected to a communications box, called a TWIT. The TWIT serves several functions, allowing the computer to talk to and listen to the tape recorder, from which it gets its timing signals, and sending commands out to the other components in the system. These commands are received by the . . .

3) DORK, which is a small slave computer. The DORK contains a microprocessor of the 6502 family which makes it very compatible with the Apple computer, but it has only enough memory to do its job. That job is controlling all the functions of up to 42 separate devices. These devices could be lamps, strobes, motors, relays, special effects projectors or Carousel projectors, or any combination of these. The projectors are connected to the DORK with . . .

4) PRIC boards which are slightly modified versions of the universal a.c. switching module which was designed by Joe Hopkins. The PRIC boards have only a hand-full of components on them, and can be constructed for about $15.00 each including cables and enclosures. In many cases the PRIC boards can even be mounted inside the projector they control.

The entire system is strung together with only two audio cables. About six DORK devices can strung together to control over 240 projectors or devices. Since each DORK is programmed to control all the devices plugged into it, the Apple computer has only to read commands from a table, read the time from the clock signals on the tape, and send out a command at the appropriate time. These commands are addressed to a particular DORK and projection device. When the DORK sees a signal with its address on it, it stores the command, then executes it, regardless of how long it takes (such as a long dissolve) while the Apple computer is free to send out another command. This means that many events can occur simultaneously without having to wait for the command to be completed before another command is given.

For all its simplicity of hardware, the real beauty of the system is the software. The hardware is basic: it consists of switching modules and microprocessors, but the software is quite another matter. Written in 6502 machine language, it operates efficiently and at very high speeds. It is user friendly to the extent that only a couple of hours of time are needed to master the commands and start entering planetarium shows. Since nearly everything is done in software, the system is easily updated as new command structures are added to the system. Having good software eliminates the need for specialized equipment, such as animators, cross faders, and stepper switches. It's all done in software.

In operation the programmer first produces his show's audio tape, mixing voice, music, and sound effects. When the audio tape is perfect, the Apple is instructed to generate a digitized clock signal which is recorded onto a blank track of the audio tape. Once this is done, the audio tape never has to be edited again regardless of how the visuals, slides, and special effects are altered.

Next the slides are loaded into trays and placed on their respective projectors. Commands are then typed into the Apple as prompts appear. Commands are available to dissolve up or down at any rate, to find slides by tray position number, to turn on and off various motors, actuate relays, etc. As each command is typed into the

computer, it is automatically performed by the DORK, so that you can see what the show will look like even as you type it in. Times at which events are to occur are entered just like other commands. When editing is needed, even the times can be changed, so that if you want a slide to come up 0.2 seconds earlier, only the one command line with that time on it needs to be changed. This gives the programmer the ultimate in editing capabilities.

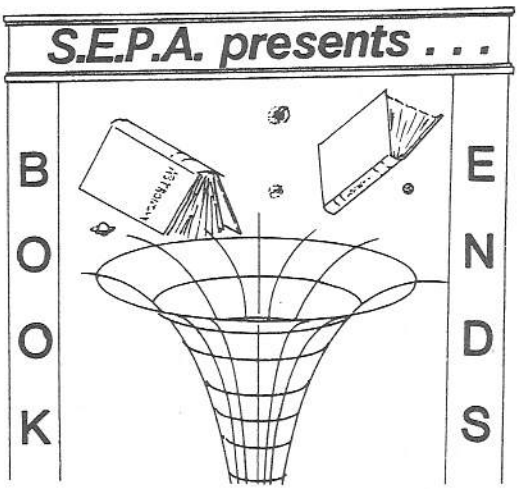
Naturally the command codes can be stored on floppy disks and called up as needed to run the planetarium show. As the audio tape runs, the Apple reads the time signals and sends out the commands at the proper time.

The system can also be operated in immediate execution mode. Here the operator enters commands live, during the program. Again each command is performed as it is entered.

So far the system is working beyond expectation. I currently have ten Carousel projectors, six special effects projectors, the all-sky projector, the lamp circuits for the planetarium sun, moon, inferior and superior planets, meridian, ecliptic, coordinates, pole, and cardinal point projectors attached to the DORK. As time permits, more devices will be added. The system has been running for about two months. While this is not a long time, nearly 75,000 commands have been read and executed by the system without a single missed cue or out of place slide.

Perhaps one of the best features of the Cocoa system is the fact that for the first time, planetariums have a control system specifically designed for planetariums. My DORK system is the first to be installed outside of Mike Hutton's planetarium, but it won't be the last. Already others have been ordered, and I'm sure more will be installed in the future. All the planetariums with the system installed will be compatible, and for the first time programs will be easily transportable from one planetarium to another. Just pop on a few slide trays, boot up a disk, and the program will be off and running.

My quest for the ideal control system has ended. I can now start oiling some of those other squeaky wheels knowing that the control system I have installed can easily grow to meet all future needs under my dome.



RENDEZVOUS WITH HALLEY'S COMET
by Sam S. Mims
Space News Publishing Co.
P. O. Box 66521
Baton Rouge, LA 70896
ISBN 0-936591-00-5 Retail price $4.95
44 pages, 25 illustrations, 4 star maps, Index.

I know, you're saying, "ANOTHER %$%&*#@ comet book???!!! This isn't just another comet book, however. At the same time, while it talks about comets generically, and Halley in particular, this has the best finder charts of any comet book out.

The book happens to parallel our current Halley program at the LASC Planetarium, but that isn't the main reason for recommending it though. Besides the lavish illustrations and diagrams, it is chock full of information a student needs to do a class report on Comet Halley. RENDEZVOUS assumes no prior astronomical knowledge, unlike many Halley books on the market. In addition, one of this book's strong selling points is that it ranges widely in telling more about the comet than just how to find it. And though it does cover many different topics in its 44 pages, like a good planetarium program it manages to keep on target with respect to what it is trying to do in those 44 pages. All this and inexpensive too. Get it!

Meet the Candidates

REGINA C. CATES
STARS Planetarium
Ocean Springs, MS 39564

Education: B.S. in Zoology, B.S., M.Ed. in Secondary Science Education from Mississippi State University; 16 hours toward doctorate (program on hold at present)

Work Experience & Organizations: Classroom teacher in Biology, Chemistry, Physics 8.5 years; Director of STARS Planetarium since February 1, 1982; Past Chairman of science department, member of Planetarium Advisory Board during its establishment; Member of NSI, ASP, South Mississippi Astronomy Association (honorary membership)

We work closely with NASA's NSTL facility as a satellite Teacher Resource Center and with the coastal schools in their astronomy and space science classes. As an educational facility of the Jackson County Schools, I feel that our responsibility is to educational excellence. All planetariums are classrooms and their forward thrust should continue toward quality instruction and programming for everyone. As an educator my goal is to ensure that quality within my profession survives.

LEE GOLDEN
Daytona Planetarium
Daytona Beach, FL

Lee Golden, who is currently Director of the Daytona Planetarium in Daytona Beach, Florida, has been involved in the planetarium field since 1970. He began his sky teaching career as a part-time student assistant at the Buehler Planetarium at Broward Community College in Fort Lauderdale, Florida, where, after two years, he progressed to the position of planetarium lecturer and show production technician. After another year in this position, Lee took leave to finish his education at the University of Florida where he graduated in 1976 with a Bachelor of Science degree in Astronomy education. Two months after graduation he accepted the position of Planetarium Director at the Mark Smith Planetarium in Macon, Georgia where he remained for four years making many improvements at the planetarium's facilities and programs.

In 1980 Lee accepted the position of Physical Science Curator at the Jacksonville Museum of Arts and Science and Brest Planetarium in Jacksonville, Florida. He remained there for three years as director of the Museum's Science theater and could hardly wait to get back under a dome. His wish was granted when, two years ago, he heard of an open position at the Daytona Beach Planetarium. There, after two years as Director, he has made many improvements to that facility increasing attendance by over three hundred percent and adding new varieties of programming including laser concerts. Lee is officially an employee of the Volusia County Florida School Board and teaches astronomy to over twenty thousand visiting school children each year.

Lee is thirty-four years old, is single, and owns a new home in Daytona Beach. Currently he is spearheading a fund raising plan to replace his (barely) existing Goto/Viewlex Venus projector with a new Minolta MS-15. The school system in Daytona Beach, thrilled with the public response to Lee's programming, hopes to build a new planetarium and science center within the next two to three years. Replacement of the star machine will take place this year if all goes well. Until funds are available to build the new center the instrument will be used in the existing forty-foot domed chamber.

Lee has been an active member of SEPA for the last eleven years and now feels that he would like to contribute his time and talents to the planetarium profession as president-elect of our organization. He would greatly appreciate your vote of approval and looks forward to seeing all of you again at the Morehead Planetarium this June.

UNITED STATES SPACE FOUNDATION

RICHARD P. MACLEOD
EXECUTIVE DIRECTOR

FOR IMMEDIATE RELEASE

FRIDAY, JANUARY 31, 1986

SUPPORT FOR SHUTTLE FUND

POURING IN FROM AROUND NATION

Offers of money and support for the United States Space Foundation fund to replace the destroyed space shuttle Challenger have been pouring in from across the nation.

Schools, organizations and individuals all over the U.S. and Canada have saturated the seven Foundation phone lines since the Space Shuttle Fund was announced on Wednesday. All are asking how they can help the effort to keep America moving ahead in space exploration to commemorate the Challenger crew. Regional fundraising initiatives joining in the Space Shuttle Fund drive have increased hour by hour.

Richard P. MacLeod, Executive Director of the Space Foundation, recounted some of the grass roots efforts at a press conference held in Colorado Springs this morning.

Mrs. Karen McPhillips, a mother of two fourth-grade students in Gillette, Wyoming, is asking all school children to donate $1.00 each, to be contributed to the Space Shuttle fund.

Albany County Kids for Space Shuttle (ACKSS), initiated by Jed and Joy Spaulding, ages 11 and 8, has requested a meeting with the Laramie, Wyoming City Council to get approval for a fund raising campaign on Valentines Day. They plan to seek $1.00 contributions from school children, as well as larger amounts from businesses and organizations throughout that area.

A group of employees at NASA's Johnson Space Center in Houston is collecting money from their co-workers, as are Lockheed employees in Georgia.

Radio station WMJJ in Birmingham, Alabama, is raising money among its listeners by airing portions of President Reagan's Tuesday evening speech to the nation set to John Denver's song "On the Wings of a Dream."

Six local bands in the Joplin, Missouri area have announced a rock and roll dance concert, to take place at the Joplin National Guard Armory on Saturday, March 8, with proceeds to benefit the Space Shuttle fund.

Two firms have plans to sell T-shirts commemorating the ill-fated shuttle mission 51-L with proceeds to benefit the Space Shuttle Fund. And Dennis Mitchell, a computer enthusiast in Rapid City, South Dakota, has posted an invitation to fellow "hackers" throughout the country to contribute, using the CompuServe national computer network.

Dr. and Mrs. Patrick Clinch, are canvassing the Rapid City, South Dakota area for funds with the support of a local television station. An internist, Dr. Art Gleiner, has begun a similar fund raising drive in Rochester, New York, with the cooperation of a local newspaper. Additionally, Colorado Air Equipment Inc. and Total Fuels Inc. of Niwot, Colorado, has pledged a percentage of their gross profits from the sale of their "Challenger" product line over the next two years to the Space

Shuttle Fund. The firms are sub-contract suppliers to space program contractors.

"We're impressed and thrilled with the initiative the American people are taking in this effort," MacLeod said. "This whole thing has come about because people cared and asked us what they could do. Now, we're hearing from schools, companies and civic groups, as well as individuals. The outpouring of enthusiasm and pride in the space program demonstrated by all these people is just awesome."

MacLeod explained that there is no way to estimate the amount of money represented by the inquiries.

"This all happened in a matter of hours -- but First National Bank met the need and organized the procedure for receiving donations and keeping an accurate record of everyone who's donated. We've established a trust account there and the First National people will pick up directly from the post office."

MacLeod explained that the money will be turned over to NASA to apply toward a replacement for the Challenger.

Donations to the fund should be addressed to: The Shuttle Fund, Post Office Box 51-L, Colorado Springs, Colorado 80901.

The United States Space Foundation is a private, non-profit educational foundation established in 1983 to stimulate a national dialogue on the beneficial uses of space and integrate space material into the curriculum of schools at all levels from elementary through college. As a NASA Teacher Resource Center, the Foundation provides space educational materials to schools throughout the country and promotes the National Young Astronaut Program. At the professional level, the Foundation sponsors the annual National Space Symposium, with pro and con debate on key space issues. The Symposium has featured such speakers as Dr. Edward Teller; James Beggs, NASA Administrator; Lt. General Jim Abrahamsen, SDI manager; Ms. Jennifer L. Dorn, Director of Commercial Space Transportation, U.S. Department of Tansportation; Astronaut Deke Slayton, President, Space Services, Inc.; Dr. Richard Garwin, Union of Concerned Scientists; Lt. General Daniel Graham, USA (Ret.), Director, High Frontier, Inc.; Jules Bergman, ABC News Science Editor; Craig Covault, Space Technology Editor, Aviation Week and Space Technology; Dr. Carol Rosin, President, Institute for Security and Cooperation in Outer Space; David Emery, Deputy Director, U.S. Arms Control and Disarmament Agency; and Congressman Newt Gingrich.

The Foundation is presently developing plans for a national space museum/exploratorium and space education center in Colorado Springs, including an Imax theater showing the same motion pictures as the National Air and Space Museum in Washington, D.C.

The United States Space Foundation is located at 1525 Vapor Trail, off Fountain Boulevard next to Airport Raintree Inn. The telephone number is (303) 550-1000. Mailing address is P.O. Box 1838, Colorado Springs, Colorado 80901.

Donations to the Space Shuttle Fund should be sent to P.O. Box 51-L, Colorado Springs, Colorado 80901.

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FOR ADDITIONAL INFORMATION CONTACT

BILL KOSHELNYK, 303/574-1790

WANTED

Planetarium Director
Northside Planetarium
Available August 1, 1986

Master's Degree and Georgia teaching certificate required, as well as planetarium experience.

Salary scale: $25,000-$39,000

220 day schedule

For more information contact Dr. Elizabeth Feely, Area Superintendent, Area III Office, 2380 Peachtree Road, NW, Atlanta, GA 30305. Send copy to Northside Planetarium, 2875 Northside Drive, NW, Atlanta, GA 30305.

Summers' Solstice

The summer solstice begins a new summer each year. This year, since the moon is full, the learned doctors are foretelling the beginning of two new Summers. One for your calendar; the other for the Assistant Editor and spouse. Watch this column for reports of the outcome of this prognostication.