

SOUTHERN SKIES



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Your cooperation will insure the continued timeliness of Southern Skies.

Contributing photographers: Susan Snow, Jackson County Astronomical Society, p. 8; Paul Bartley, Bradenton, Florida, inside back cover.

Southern Skies would like to express appreciation to Ruth S. Freitag at the Library of Congress, Washington, D.C., for allowing us to reproduce her article on Halley's Comet and accompanying photographs. They are reprinted from the Summer 1983 issue of The Quarterly Journal of the Library of Congress.

Southern skies



Vol. IV, No. 3

August, 1984

A Message

From the President

by Duncan Teague

What has one hundred thirty delegates, thirty papers, six workshops, three star shows, two laser light shows, a special "adults-only" show, an electronic music concert, a hilarious lunch speaker, a spell-binding banquet speaker, a dinner cruise, a symposium, super exhibits, enthusiastic commercial and community support, and a relaxed but professional atmosphere? You guessed it. SEPA '84! (Gee, I left out the T-shirt and the kitchen appliance.) I can't think of a more professionally rewarding experience than the one we shared a few short weeks ago.

The staff of the Bishop Planetarium are true professionals. A "pro" can accomplish the very difficult and make it look very easy. Saturday afternoon Regina Cates and I went back to the planetarium to see George Fleenor's "Threshold" program again. It was just as professionally performed for the public as it was for our group. Only constant attention to detail can make a conference for so many run so smoothly with so few (how about zero?) problems.

Our luncheon speaker, Keith Goering, made a delightfully funny presentation, "The Few That Work." I was certainly flattered to be included in the faculty of the Famous Planetarian's School. The best fun professionals have is when they are not taking themselves too seriously. In the midst of the applause signs and exploding slide projectors, I couldn't help wondering how many would go to so much trouble unless they had something to sell. The answer was found



just by counting the number of people in the audience.

Participation in SEPA '84 was outstanding in terms of both the quantity and the quality of the papers, workshops, and special programs presented. It is a real inspiration to attend a function in which there is so much sharing of creative ideas.

Our banquet speaker, Hansen Planetarium Director Von Del Chamberlain, gave us a new perspective from which to view our planet and our planetarium. His presentation, "Through the Eyes of the Comet" sparked a tremendous number of enthusiastic comments.

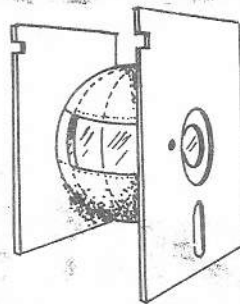
Some thought that he had previously put this presentation together and had just been kind enough to share it in a slightly altered form with the SEPA membership. It soon became apparent that the thirty-minute program (The term "lecture" doesn't seem to fit) to which we were treated was written just for presentation at our conference and to our group. Some people really take the time to do their homework.

"This would make a great star show," was the opinion expressed by many. Von Del seemed a little embarrassed at the attention. He said he would be reluctant to compete with the star show Hansen had already produced, and he mentioned some possible problems with copyright permission to reproduce some of the 1910 newspaper photographs. Nevertheless, he asked that he be given a chance to "think about" the possibility of a SEPA-produced star show based on his presentation.

I for one think Comet Halley is a subject we can afford to address twice in the next eighteen months. Take a look at the insert in the center of this issue of Southern Skies. Tom Hocking has obtained some of the photos from the Library of Congress for reproduction in our journal, and the complete text of Von Del's "Through the Eyes of the Comet" is reproduced. Enjoy.

Well, I've been talking about my favorite subject--professionalism. SEPA folks have it. It's the ability to get the job done with thoroughness and attention to detail, with style and grace, and to make it look easy.

Have a good summer!



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

ASTRO-AID and ASTRO-CALC
Reviewed by Duncan Teague

"ASTRO-AID" and "ASTRO-CALC" are two astronomy programs for the IBM PC and for the Apple II, II+ and IIe computers. This review is based on the 64K IBM versions; many of you saw the Apple versions demonstrated at SEPA '84 in Bradenton. (By the way, congratulations to the two lucky individuals who won a copy of one of these two programs as a door prize.)

"ASTRO-AID" displays a menu of 11 choices:

1. Time Conversions
2. Coordinate Conversions
3. Basic Conversions
4. Precession, etc.
5. Kepler's/Newton's/Einstein's Laws
6. Telescope Design
7. Equinox/Solstice, Polaris Transits, Jupiter's Moons
8. Solar System Data
9. Constellations
10. Stars
11. Exit Program

As you might expect, the first three options provide quick conversions from one measurement system or from one coordinate system to another. Option 1 handles solar time correction and conversions between the Gregorian and Julian calendars, between local mean time and sidereal time, and

between Universal Time and Ephemeris Time. Option 2 provides conversions between galactic, equatorial and alt-azimuth systems. Option 3 provides conversions for units of distance and temperature in the English and metric systems and between hours, minutes and seconds and their decimal equivalents.

Option 4 corrects for changes introduced by precession, nutation, aberration, parallax and refraction. Option 5 is a tutorial reminding you of basic concepts of classical and relativistic motion and trigonometric relationships.

Options 6 and 7 tell you how good your telescope is and what you can expect to see through it. Telescope Design will tell you for example, your 6-inch reflector's limiting magnitude, resolution and stellar image diameter. The next option will give you a graphic depiction of the appearance of Jupiter's Galilean satellites for a particular date. It will also tell you the exact time of the equinox or solstice for the season of your choice and when Polaris will next transit the meridian.

Options 8 through 10 are like the appendices at the end of a good astronomy text. In these options you'll find data on the sun, the moon and the planets and their satellites; the constellations, their primary stars and star lore; and on the twenty individual stars whose apparent magnitude is greatest and distance closest.

That's a lot of information at your fingertips, or rather at your computer's disk drive heads. I believe "ASTRO-AID" is just what its name claims to be, an aid to any individual who needs quick access to astronomical information about a variety of subjects.

While "ASTRO-AID" provides a quickly-referenced "encyclopedia" of astronomical information, "ASTRO-CALC" concentrates on positional data. It "calculates" with double-precision algorithms the position of the sun, the moon or any planet for the date input by the user. The instruction manual salutes the Astronomical Almanac as the standard for accuracy, but proudly points to the fact that "ASTRO-CALC" is a "convenient substitute where great accuracy is not a necessity."

The information required of the user is pretty standard: time, a choice of nine options for time zone and a 24-hour clock format; date, all numerical entries; and location, positive entries for north latitude and west longitude with all entries in decimal degrees.

The final entry is choice of output modes:

1. All Output
2. Sun Only
3. Moon Only
4. All Planets
- 5-12. (Individual Planets)

In my session with the IBM version of "ASTRO-CALC," I asked for March 10, 1982, the date of the "Jupiter Effect," and selected the "All Output" option. I thought it would never end.

The first of twenty full screens of information displayed a summary of my initial entries, the Julian day number, several relevant mean and local times, the equation of time in minutes, and a dozen and a half other calculations. These included the mean and true values of the sun's geometric longitude and anomaly, its position in alt-azimuth and equatorial coordinates, sunrise/set/twilight duration times, the earth's heliocentric longitude and orbital eccentricity, the sun's angular size and equation of center, and the sun/earth radius vector.

Whew! The manual provides an excellent tutorial on positional astronomy which explains some of the less familiar quantities.

The information on the moon was a little more familiar. The moon's age, phase (fraction illuminated), position, distance and elongation from earth and sun, rise/set times, angular diameter and parallax are displayed.

The planet information was divided between two screens. The first gave heliocentric data; the second, geocentric. Heliocentric information was divided evenly between orbital elements and position. Geocentric information included position and observational data such as magnitude, fraction illuminated, angular size and rise/set times.

The biggest surprise was saved for next-to-last. The final two screens are a graphic display of the sky thirty degrees above and below the celestial equator and a summary table of the key information for all the above objects. The graphic display shows 0 hours right ascension at the left side of the screen and increases to 24 hours on the right. Yes, it's backwards.

Mr. James T. Paulsel, President of Zephyr Services, confirmed in a telephone conversation that the problem will be corrected. Much to my surprise, the graphic display doesn't appear in the Apple version.

"ASTRO-AID" and "ASTRO-CALC" are both furnished with excellent manuals which include the aforementioned tutorial, sample output and a complete listing of the BASIC program. The manual alone is available for purchase at \$16.95 if your computer is neither an IBM nor an Apple. Each program is \$29.95 plus \$2.00 shipping per order. Free replacement for problem disks is offered for 90 days, after which a (very reasonable) \$4.00 fee is charged. For further information contact Mr. James T. Paulsel, Zephyr Services, 306 South Homewood Avenue, Pittsburgh, Pennsylvania 15208.

"SUN"

Reviewed by Duncan Teague

"SUN" is a computer program which calculates sunrise/sunset times. It is available on tape for any of the Timex/Sinclair line of computers. Since the program is written entirely in BASIC, the listing could be typed in at the keyboard of any computer which uses that language. The only exception which comes to mind is one "poke" instruction which causes the TS/2068 keyboard to "beep" when a key is depressed.

"Sun's" first screen is a list of instructions which reminds me of an educator's behavioral objective. The instructions say, essentially, if you know your name, where you live and your time zone, then this program will tell you what time sunrise and sunset occur for a given month or a given year.

The first information requested is your name, so the display or printout can be "personalized." Next you're asked for the name of your location, your latitude, your

longitude, your time zone and whether you are on standard or daylight time. You are then given a couple of options: (1) whether you want the information to be displayed on your screen or printed on your printer; and (2) whether you wish the calculations to be made for one month or for a calendar year.

The calculations are handled with "strings" on the TS/1000 and 1500; with data statements on the 2068. I was disappointed that only every third date was displayed. This decision was made, no doubt, to speed up the results for impatient users. Simple interpolations will give you "close" to accurate times for the dates between calculations, except near the equinoxes. When the calculations are completed, you are given the option of changing the aforementioned options or of ending the session.

The program is put together very professionally. Screen displays are uncluttered, instructions are clear, and results are accurate. "SUN" is \$6.95 and is available from developer Mr. Earl W. Cunningham, K6SE 41041 27th Street West, Palmdale, CA 93550.

Star Trek: The Planetarium Show

by Gary Tomlinson
Chaffee Planetarium
Grand Rapids, Michigan

The Chaffee Planetarium of the Grand Rapids Public Museum, in conjunction with the Star Trek Club of Grand Rapids, has produced a planetarium multi-media program on the "Star Trek Phenomena." It is a look into how Star Trek was conceived and developed as a television series. Through the use of slides, movie clips, specially constructed special effects and recorded narration by various cast members, the audience looks at the show's history from the first pilot, to cancellation, to syndication and finally into big screen production. Also discussed is why "Star Trek" is good science fiction; why it continues to be popular years after it left television and how it survives as a big budget, large screen production.

In addition to "Star Trek--the Planetarium Show," the planetarium is showing "Cosmic Mysteries," a program describing the seven most puzzling astronomical mysteries of our time, narrated by Leonard Nimoy, and a display of look-alike props and memorabilia.

Moire Patterns for the Planetarium

by Roy Young
Wetherbee Planetarium

This article describes some simple moire patterns that can be used to simulate such things as a meteor shower, a Christmas Star, a rotating globular cluster and an atom with moving electrons. All of these effects have been used at the Wetherbee Planetarium and also the Mark Smith Planetarium in Macon, and were demonstrated at a meeting of Georgia planetarians in Columbus last September.

Our special effects projectors are all designed on a modular basis similar to the ones described by John Hare in the November 1981 issue of Southern Skies. The basic rotating module is modified with a mask in front of the bearing, as shown in Figure 1.

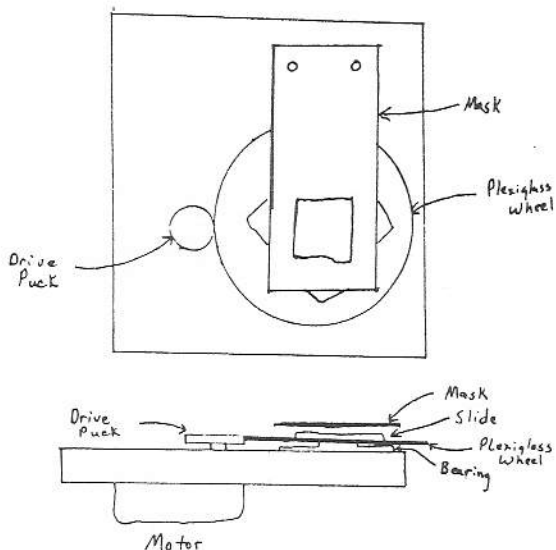


Figure 1

One piece of Kodalith is mounted on the bearing and of course has a circular motion. The bearing we use is an inexpensive Nice 5418. It has a central hole one inch in diameter with a raised lip that we glue our three-inch plexiglass wheel to. We use a silicone glue for this and check alignment of the wheel by spinning the bearing fast and noting if the wheel wobbles. By making careful adjustments all of the wobbliness can be cured and the wheel is exactly centered on the

bearing. A drive puck is used to turn the wheel, although a belt drive would work just as well. The Kodalith is attached to the wheel using silicone glue and the same alignment procedure is followed to make sure the slide is centered on the wheel. The other piece of Kodalith is on the stationary mask. This mask must be mounted as close to the rotating Kodalith as possible.

Figures 2A and 2B show the artwork for the meteor shower effect.

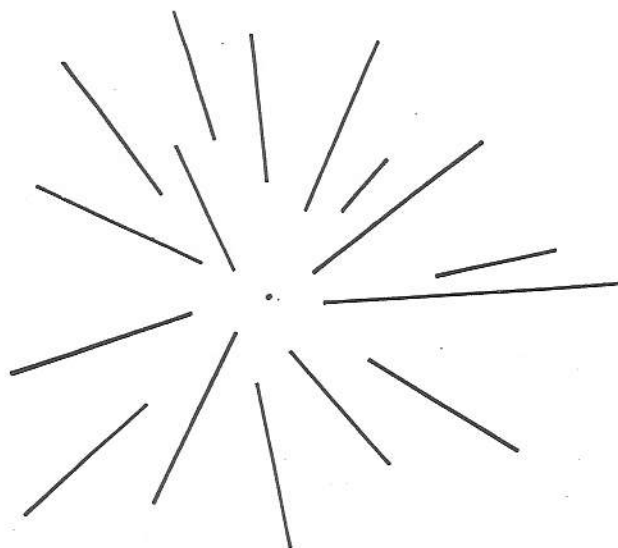


Figure 2A

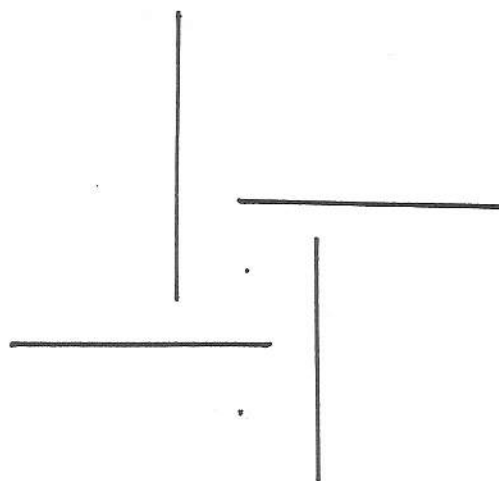


Figure 2B

Figure 3 shows the artwork for a Christmas Star that appears to shoot out rays of light in all directions. Both the rotating and stationary pieces are the same, so make two Kodaliths of this. The star looks best when projected small and adds a great touch to any Christmas show. By the way, projecting this at a larger size and speeding up the motion makes a good quasar.

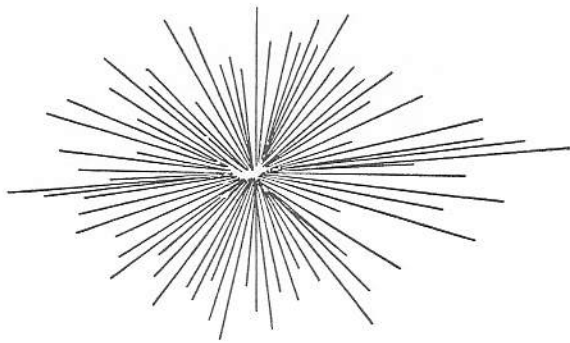


Figure 3

Figure 4 is the artwork for the rotating globular cluster.

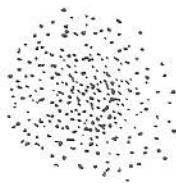


Figure 4

Once again, you need two Kodaliths of this. Focus on the rotating piece of artwork and the cluster will appear to rotate and twinkle. This twinkling effect is caused by the stationary mask in front blocking out the light at different times.

Figures 5A and 5B show the artwork for the helium atom.



Figure. 5A

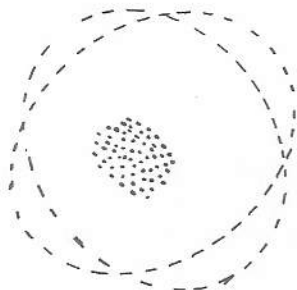


Figure 5B

With this particular effect you will have to mount Figure 5A as the rotating slide. The two electrons criss-cross as they move around the central "nucleus" which also twinkles. You can make as many electron shells as you want by adding more dotted lines to Figure 5B.

These are just a few of the unique special effects that can be created using moire patterns. For more patterns you might want to buy Optical Designs in Motion with Moire Overlays by Carol Grafton. This book contains 81 optical patterns and 4 moire overlays for all kinds of wierd special effects and is available from Edmund Scientific (K31,266) for \$4.95.

SEPA Script Bank Update

by Don Walter
I.P. Stanback Museum and Planetarium
Orangeburg, South Carolina

I intend to print a supplement to the script bank file this fall, provided there are a sufficient number of additions. Each one of you who has a show script worth sharing with the rest of us, please send a copy to me: Don Walter, Planetarium Director, South Carolina State College, Orangeburg, South Carolina 29117.

To keep the membership informed of what is available in the bank, include the following information with your script:

1. Title
2. Author's name
3. Author's address
4. Year in which script was written
5. Whether show is for school group, public or both
6. For school shows, indicate grade level
7. A one-paragraph abstract of show

If your show is of a specialized nature (hearing impaired, foreign language, etc.) include a note to that effect. Also, if you wish to restrict circulation of your script to SEPA members only, clearly indicate that when you submit your material. Otherwise I will assume your script is available to anyone willing to pay for its duplication.

Editing *Dawn of Astronomy* to Less than 45 Minutes

by Michael F. Ryan
Lake County Schools Planetarium

For those of us who purchased the show package from the Hansen Planetarium, the star program "Dawn of Astronomy," the material is starting to make its way into planetariums after some delay.

Typical of Hansen star programs, the artwork is outstanding. Also typical of their shows, "Dawn..." runs some 55 minutes. Unfortunately for many of us, this length of program is too long for our needs.

(I don't know if you have experienced this, however, the more I stay in the field, the more I am sensing that shorter programs have the benefit of getting the point across to the audience without boring them with too much.)

Additionally, I am stuck with the problem of being limited to a 7" tape deck which is used with 1.0 mil tape. As you know, the maximum running time with this format is 45 minutes. Thus I knew at the outset that some 10 minutes would have to be trimmed from the program. (Some of you might suggest that I use 0.5 mil tape and run the full 55 minutes. There are distinct problems here. Recall what I said last year in a series of articles on tape usage: the thinner the tape, the more prone you are to "print-through" problems and the more likelihood you have of stretching the tape on rewind.)

After reading the script, I realized that the task of editing was not going to be as easy as I had hoped for. Unlike other shows (i.e. Hansen's "The People" or Jack Horkheimer's "Starbound") the program is not segmented too much. This complicates the job, but there is hope.

What follows here is simply one suggestion as to how the editing can be done. It is certain that a number of you will probably disagree with the cuts, but that's what diversity in this field is all about. My

advice is just that and is not intended to be cut in stone. There are other ways to tackle the job. (One planetarian suggested dividing the program into two shows: [1] Egypt and [2] Stonehenge.)

First Cut: P. 1 and 2, the knife bone sequence. Except for a chronological introduction, the deletion of this does not detract from the program. One problem though...the background music for main titles does not fade out at a convenient spot before the footsteps are heard. Solution...use another piece of music for main title. Try the last 45 sec. of cut 2, side 2 from the "Wrath of Khan" soundtrack album and pray that you don't have a Trekkie in the audience recognizing familiar strains of music.

Second Cut: P. 6 and 7, the Osiris, Orion mythology and

Third Cut: P. 7 through 11, the flooding of the Nile. My thinking here was that people coming to this show were interested in the Cheops pyramid section and could lose their interest with this other material. Also, there is a nice segue from the segment dealing with directions and the association of death in the west (prior to page 6) to the portion of the next segment (page 12+) pyramids and afterlife.

Last Cut: PP. 26-28, Aikey Brae. Rationale same as above...they want Stonehenge...so we give them Stonehenge without devoting time to similar structures.

How long a program are you left with?
38 minutes.

Planetarium Group Formation

There will be a meeting held for all those planetarians interested in forming a planetarium group for the Tennessee-Kentucky area. The meeting will be held Sunday, November 11 at 10:30 a.m. at the Sudekum Planetarium, 800 Ridley Blvd., Nashville, Tennessee 37203. For information concerning the meeting contact either Larry Miller at the Sudekum Planetarium or Rita Fairman at the Akima Planetarium, P.O. Box 6108, Knoxville, Tennessee 37914.

Report of Annular Solar Eclipse from Mississippi

by Regina Cates
STARS Planetarium
Ocean Springs, Mississippi

No doubt, by now almost everyone has heard about or has seen either directly or indirectly, the annular eclipse of May 30, and the scads of resulting prints, slides and movies brandished by their proud owners like baby pictures at a family reunion. And you're tired of it all.

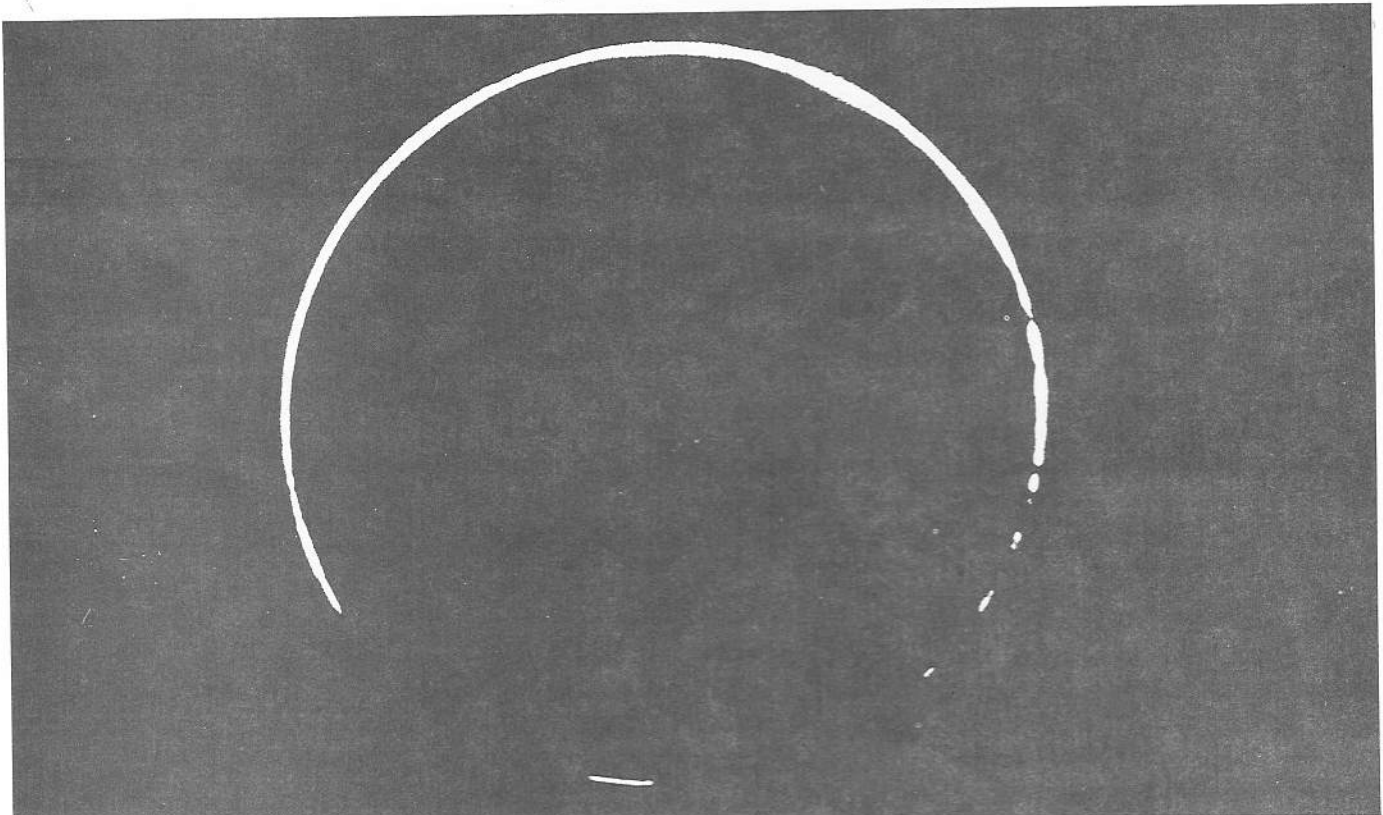
Well, tough patooties! Tom Hocking, our journal editor, decreed that I write a summary of my observations of the eclipse as it occurred in Wiggins, Mississippi. In a most impressive way, he makes it hard to say no. So to placate our nefarious editor, READ.

According to national news, the eclipse did not occur in Mississippi. The path swept across the southeast in Louisiana, Alabama and Georgia. Yet on May 30, more than 500 people from all over the USA converged on

Flint Creek Water Park in Wiggins to view the annular eclipse. Even the National Geographic people were there. From the time the shadow entered Mississippi until the time it left, the eclipse was recorded and measured by astronomers situated at intervals all through the center path and its edges. Much planning had gone into the network organization of these people and their observing sites.

Those of us at Flint Creek were in the center of the eclipse path. First contact occurred at 14 44 00.1 UT. From that point on all attention was on the eclipse. Crowds gathered around scopes that were projecting the sun/moon. Short wave radios remained tuned to the time signals and equipment was constantly checked.

Second contact came at 16 08 38.8 UT. 10.5 seconds later came third contact. During this short time span shutters clicked and recorders recorded. We were treated to some spectacular formations of Bailey's Beads. Someone knowledgeable in lunar surface geology pointed out mountains to viewers. Venus appeared fairly bright at maximum. The children were fascinated by the natural pinhole projections formed by tree leaves. The dog, definitely an amateur, became nervous and punchy. The light changes color. The wind blew harder and the air was COLD.



Through the Eyes of the Comet

presented at
Southeastern Planetarium Association
Conference
June 21, 1984
by Von Del Chamberlain

Perhaps it was thousands of years ago that the comet now known as Halley's began swinging past Earth, blossoming in the sky to signal another human epoch. No one knew until near the end of the 17th century that it was a singular object. I thought it would be fun for us to look at planet Earth, and at ourselves, as though we could see through the eyes of this solar system probe each time it swept by. Let us begin with what may be the most ancient record, 256 B.C.--year 0 in Halley's Comet years.

Aristotelian physics had begun its 2000 year domination of scientific thought. We had seen a variety of mythological interpretations of the world and several significant early scientific ones. Aristarchus of Samos (c. 310 B.C.) had already stated the notion of a Sun-centered system.

The 256 B.C. apparition of the comet was during the times of Eratosthenes, who measured the planet, and Hipparchus, who catalogued stars. One wonders what influence this "hairy star" might have exerted upon those astronomers. In those days, teachers of astronomy probably met their students under Nature's stars. The Armillary Sphere was in existence and the Farness Atlas, that marble constellation sphere held by Atlas, stood in some place of honor to depict human concept of the starry sky through which the comet glided. In central America the Maya were counting the cycles of Venus. They, too, probably noticed the Comet in the sky.

It was also during this era that Archimedes (c. 287-212 B.C.) built the world's first--so far as we know--planetarium. In Henry King's classic book, Geared to the Stars, we learn that Archimedes had made at least two globes, one with stars on it and the other a mechanized model of the Sun, Moon and planets. Quoting Cicero, King wrote:

Archimedes deserved special admiration because he had thought out a way to

represent accurately by a single device for turning the globe, those various and divergent movements with their different rates of speed. And when Gallus set the globe in motion, it was actually true that the moon was always as many revolutions behind the sun on the bronze contrivance as would agree with the number of days it was behind in the sky. Thus the same eclipse of the sun happened on the globe as would actually happen, and the moon came to the point where the shadow of the earth was at the very time when the sun (appeared?) out of region.

It was a model according to Aristotle and those who recited his catechismic rhetoric.

The comet may have looked like this in the night sky...and its view of the night Earth would have looked like this...as those greats and others on Earth looked at it.

Again and again the comet dipped out into the darkness, then back into the sea of solar radiation. In 12 B.C., its third year, it was seen over Rome, observed by the Chinese, and likely seen by a worldwide audience who wondered at it and created interpretations of its meaning. The 12 B.C. appearance would be interpreted some 1,300 years later by an artist as the Star of Bethlehem. Had the comet looked down on the night side of the Earth it would have seen this.

It came past about 141 A.D. (fifth cycle) during the era when Ptolemy (c. A.D. 90-168) wrote the Almagest and made his celestial globe which contained the basic motions we would one day see built into modern planetarium projectors. Here, again is a night view of Earth seen through the eyes of the comet.

We all know the many examples of how this and other comets were viewed as harbingers of disaster and doom: the Battle of Hastings and death of King Harold, depicted on the Bayeux Tapestry--the 1066 apparition of Halley's Comet (sixteenth cycle)--is the best known case of such comet-astrology.

In 1301 (nineteenth cycle), the artist Giotto (1266-1337) looked up at the comet. It became part of his way of breaking away from the stylized, religious Byzantine tradition. Knowing that a comet had appeared over Rome in 12 B.C.--Halley's Comet--he

depicted the comet as the Star of Bethlehem. The Comet's view of the earth...

We can guess that throughout the Dark Ages, each time the Comet coasted by, it was blamed for plagues and all sorts of human misery. The stars were regarded by many as primarily intended to foretell and to guide human events. Each sign of the zodiac was thought to govern some region of the body and each planet a bodily organ. "The macrocosm reflected the microcosm of man," it was said.

When the comet came in 1531, (twenty-second cycle), Columbus had visited America and Copernicus (1473-1543) contemplated his theory.

The 1607 (twenty-third cycle) apparition looked down on Galileo (1564-1642) and soon after it graced the sky this mathematician and physicist pointed his telescope, eyes and brain at the heavens to see, for the first time, some details of the Milky Way, the Moon, the Sun and the satellites of Jupiter. Johannes Kepler (1571-1630) used the 1607 appearance to prove that comets "moved in straight lines," amid his discoveries of the laws of planetary motion.

This time the comet looked down upon Francis Bacon (1561-1626) who preached the doctrine of inductive, experimental method, of the control and exploitation of nature. He taught that, "Nature reveals her secrets when put to torture," and advocated the collection of masses of facts by observation and experimentation from which generalizations could be induced. He was the inspiration for those who founded the Royal Society. Of the universe Bacon said, "Give me motion and extension and I will construct the world," and of himself, he said, "I shall content myself to awake better spirits, like a bell-ringer which is first up to call others to church."

The 1607 Comet also must have come to the eyes of Rene Descartes (1596-1650) who proclaimed the philosophy of a mathematical and mechanical universe. He said, "the difference between civilized man and savages is almost that between gods and men... this difference comes...from the arts." He was speaking of the mechanical arts. Of Descartes it was said, "He moved the intellects who have moved the world."

The 1607 Comet looked down upon the founding of Jamestown and those colonists must have looked up at the comet in the night. The comet looked down upon the night Earth.

The comet returned again in 1682 (twenty-fourth cycle), seven years after the Greenwich Observatory had been dedicated and eight years after the Danishman Olaf Romer had ascertained the velocity of light. This time the comet was seen by a man named Edmund Halley, just after his marriage. In 1684 Halley decided to visit Cambridge to consult with Newton. In 1687 Newton's Principia appeared with the laws of motion and the principles of mechanics including deduction of elliptical orbits. We had entered the modern world of science.

The Gottorp globe had been designed (1650-54) by Andreas Busch and others. Ten people could go inside it and watch constellations parade by. Henry King described it as:

...a large, hollow copper globe 3.1 m in diameter, erected in a summer house in the castle gardens. Visitors entered the globe through a small opening in its lower section and sat on a circular bench mounted on a stationary platform. The globe was then rotated on its inclined axis, apparently by a water-wheel and gearing, whereupon constellation figures and gilt stars painted on its interior surface and illuminated by lamps rose and set relative to an artificial horizon. To represent the sun and moon, glass balls could be moved in the zodiac, and at the centre stood an earth-ball, about 15 cm in diameter.

Also by the time of the 1682 appearance of the Comet, Erhard Weigel (1626-1699), professor of mathematics at the University of Jena, had erected a globe made of sheet-iron and it carried a zodiac to which model planets could be attached. To show stars, Weigel pierced small holes in three sized.

Clocks and orreries now proliferated upon the Earth as the Comet looked down. Halley predicted that the comet would return in 1758. From this time on, the Comet would have a name and human concepts of comets would begin to change. As the likes of Newton, Andreas Busch and Halley looked at the comet in the night, it continued to see a bland night Earth.

Halley was Astronomer Royal from 1720 until his death in 1742. His scientific prediction was fulfilled when the comet did come again in 1759 (twenty-fifth cycle), while William Herschel played with musical instruments rather than with telescopes. One year earlier Roger Long had made at Pembroke College in Cambridge a hollow star globe 18 feet in diameter. This Lowndes Professor of Astronomy would take up to 30 people at a time inside to explain the wonders of the starry universe. But, alas, it suffered from poor attendance and was eventually dismantled and sold as scrap metal.

Thirteen colonies prospered in North America, George Washington was a young general and the French and Indian War raged as the Comet peacefully glided overhead. It looked down on Earth and saw....

The Leonid meteor shower of November, 1833, stole part of the show from Halley's Comet when it swung by in 1835 (twenty-sixth cycle) as steamboats ran on the Mississippi and trains were running from Boston to Worcester. Alvan Clark was about 31 years old. The Erie Canal had opened ten years earlier and immigrants streamed westward across America. A major growth period in astronomical technology began, especially in America, as the comet moved out, then back again. Astronomical photography got started and the great Yerkes 40-inch instrument was completed in 1897, nicely in time for the Comet's next return in its twenty-seventh cycle. Telescopes also appeared on Mount Wilson.

The last time Halley's Comet came near the Earth it was observed more intensely than ever before. It was beautiful to the eyes looking up from Earth, both those of science and those of laymen. Comet pills and gas masks were sold and the merchants capitalized upon the wonder in the sky.

Now airplanes were seen in the sky and people were trying to comprehend the ideas coming from Einstein. The year the comet appeared Edwin Hubble graduated from the University of Chicago, not in astronomy, but rather in law. Robert Goddard was 27 years old and was a student at Clark University in Worcester.

The comet headed outward and as it receded, Oscar von Miller, Walter Bauersfeld and a company called Zeiss got together with the Deutsches Museum and created the "Wonder of

Jena." As it played to audiences atop the Zeiss factory (1923), Hubble discovered a Cepheid variable in the Great Nebula in Andromeda and thus determined that it was far outside our galaxy--a new dimension to human thought. The projection planetarium appeared in North America in 1930. World Wars I (1914-18) and II (1939-45) had come and gone and Robert Goddard passed into history. Fearful eyes looked upon mushroom clouds and the energy of the atom was becoming useful.

The comet rounded the bend and headed back as ~~the~~ great 200-inch telescope was dedicated on Palomar Mountain (1948). The galaxy was discovered as was the expanding universe. NASA was created and began, along with Russia, to create a space technology. The lingering radiation of the primordial fireball along with pulsars, quasars and black holes were discovered. Men visited the moon and probes were being hurled past planets to the delight of eyes and minds of Earth. These wonders were portrayed to the mushrooming population of Earthlings inside sky theaters with simulators bearing the names of Zeiss, Spitz, Goto, Minolta and others. (28 Halley cycles from globes to modern planetariums.)

The comet plunges faster toward us now, and we who use planetariums create sequences of ideas, tapes and images in attempts to explore its wonder and significance to an expectant world, realizing that many will be disappointed because the comet is not always spectacular in the sky. A few of us will explore the use of a new type of astro-projector, one with computer generated images (I had to throw that in).

Observatories have spread upon the ground and into the sky. A great observational technology awaits the comet's return.

When it comes, the comet will "see" a new world. A dramatic change is apparent! The night Earth is featureless no longer. It has suddenly erupted with constellations which reveal a great technology and a human culture caught in the struggle of using that technology without extinguishing itself. This time the comet will be greeted by robot messengers from Earth. It will be scrutinized by instruments which record across the electromagnetic spectrum. It will round the Sun once more. We will present our "Halley's" star shows for our lifetimes and leave the rest for future generations.

What will be the status of sky theaters when the Great Comet comes again in 2061 (twenty-ninth cycle)? Will they still exist at all? Perhaps the answer is to be found in contemplation of the view of Earth the comet will see in 1986. What will it see in another human cycle? Where will the dark places be? Will there be any clear sky upon Earth at all? Will it be necessary to go into space to see the stars in all their glory? What intellectual stimulus will "looking up" give to the human imagination? It just might be that star theaters will be the only places on Earth where people gather to reminisce--to remember what the stars looked like to Grandfather and Grandmother--to reflect upon what started the ages of intellect which eventually, ironically, turned night into day so that we could have fun longer, work and think longer--so that we could build planetariums, telescopes and place them in orbit in order to more fully understand the stars, but see them less well from Earth.

I sincerely hope that there "will" be places to go and stand and see nature's stars in the twenty-ninth cycle, but it just might be that those who follow us to hold our pointers and create their versions of Halley's star shows in 2061 might represent humanity's only ways to see the stars in an ever-increasingly controlled and simulated world. I leave you to ponder that possibility.

(Editor's Note: The above is Von Del's presentation exactly as he gave it to us, which included his references to specific visuals. I felt it appropriate not to edit the text at those particular points.)

The Astronomer's Love Song (Greenwich Time)

No more I feel the potent spell
Of Jupiter or Mars,
Or know the magic peace that fell
Upon me from the Stars.

A fiercer flame--a Comet-love--
Consumes my spirit now;
I cry to yon still heavens above,
"Oh! Halley's, where art thou?"

Punch, v. 138, May 11, 1910, p. 330.

The Early Riser

He won't get up to go to work,
Although the sun is high,
He turns from the alarm clock
With a swear word and a sigh;
Yet he'll arise at 3 a.m.
Without a thought of care
To gaze upon a comet
That is none of his affair.

Philander Johnson, *Evening Star*, Apr. 25,
1910, p. 6

The Comet Did It

What caused the ice to form in spring?
The Comet!
To stop the birds that meant to sing?
The Comet!
What caused the price o' things to rise
Until it reached the big, blue skies
And filled the angels with surprise?
The Comet!
What made the Lady Boss condemn--
Oh, Comet,
My coming home at 3 a.m.?
The Comet!
What made--and here's the thought
that stings--
That chap hold aces to my kings?
A little bird serenely sings:
The Comet!

Honey Jar, v. 15, May 1910, p. 24.

The Approaching Comet

The astronomers now tell us
There's a comet in the sky
Which will quite soon be apparent
To the nude, observant eye.
But here's a question we,
In all humility, propose--
Will the coming comet leave us
comme il faut or comatose?

Are these the scientific, telescopic
Comet-finders sure
That the comity of comets
Will eternally endure?
For if it's just a gamble,
It is certainly a whale,
This staking our existence
On the hazard of a tail.

N.P. Babcock, *New York American*, Apr. 14,
1919, p. 20.

Unsubstantial Display

The comet with its glories spread
Is very much more tail than head,
And so it goes parading by,
The peacock of the starry sky.

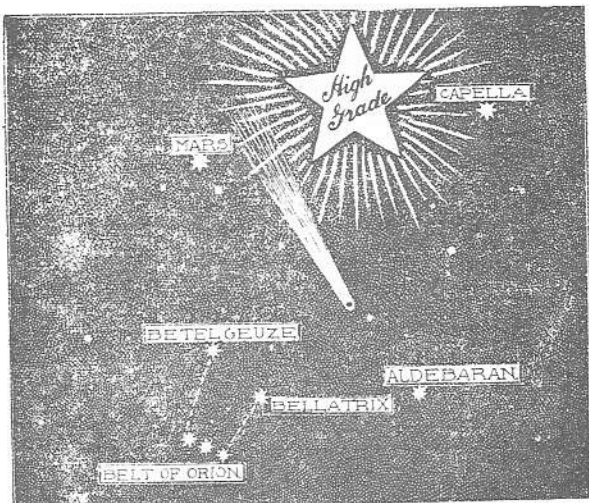
Philander Johnson, Evening Star, May 7,
1910, pt. 1, p. 6.

In Brief

The comet's report,
Of all verbiage stripped,
Is, "I came, I saw,
And immejitly skipped."

Chicago Daily Tribune, v. 69, May 21,
1910, p. 10.

SHAW'S STAR OUTSHINES HALLEY'S COMET



It's Coming Back

Now why should we get up at two,
To see if it appears?
You know we'll have another view,
In six and seventy years.

Mac, Chicago Daily Tribune, v. 69, May 10,
1910, p. 10.

Superstitious Dread

Oh, what's the use of hoping
When times like these draw nigh?
The groundhog saw his shadow
And a comet's in the sky.

Philander Johnson, Evening Star, Feb. 3,
1910, p. 6.

The Comet's Comments

Gee Whyzygy!
As a high old syzygy,
Didn't I throw a scare
Into everybody everywhere?
And didn't I
Make more people look toward the sky
Than anything that has come their way
In many a day?
Well, I should say
I did!
And didn't I kid
The bunch
On the punch
I promised to hand the earth
All round its girth?
By gum!
They got to thinking some
And they had the scare,
But they couldn't go anywhere
For relief, and so I had
The bunch in bad.
They had to stay;
They simply couldn't get away,
And then
When
They were getting ready to pray,
And turning pale
At thought of my fatal tail,
I swished by
With never a mark on the sky
Or a visible sign
Along the whole starry line--
Not even a smell
Of gas to tell
That I
Was anywhere in the sky.
By gosh!
I handed them the josh
All right
Wednesday night.
And when
I come again
This bunch will all be gone
And I can roll on
And in as before
And scare the whole world some more.
Oh say,
When a comet can play
A joke like that and get it across
It shows that man isn't the big boss
He is bluffing to be.
Take it from me.
See?

William J. Lampton, World (New York),
v. 50, May 20, 1910, p. 8.

Halley's Comet as a Medium for Advertising Messages

BY RUTH S. FREITAG

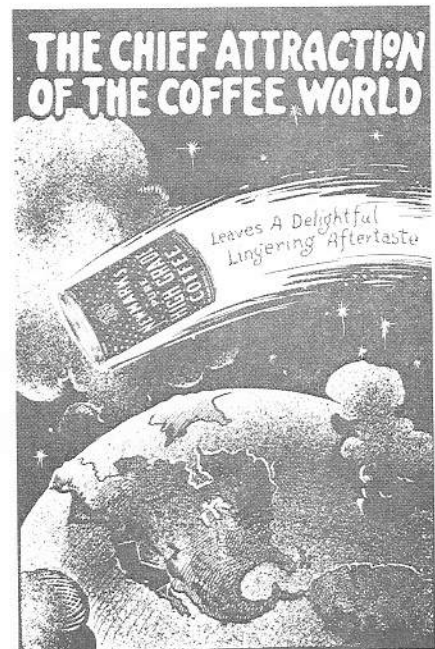
Halley's Comet in the spring of 1910 was a media event. Comet stories vied for newspaper space with reports on the travels of ex-President Teddy Roosevelt, the floods in Paris, the eruption of Mount Etna, the devastating earthquake in Costa Rica, and the deaths of Mark Twain and King Edward VII. Indeed, the comet was often blamed for these sensational occurrences.

Some astronomers spoke of the possible extinction of life when the planet encountered the comet's tail on the night of May 18, and speculated on the terrible destruction that the comet would inflict should it actually strike the earth. A minister in Pittsburgh filled the city's churches when he announced that the comet portended the second coming of Christ. Although many authoritative voices were raised to counter these frightening statements, the doomsayers were widely believed, and stories of persons driven to madness or suicide were common. Others prepared for the worst by retreating to their cellars with a bottle of oxygen, or, in the great tradition of "eat, drink, and be merry," partied all night. The general agitation was exploited by swindlers, who sold comet insurance on Capitol Hill and comet pills in Port-au-Prince. Those who are inclined to laugh at the absurdities of yesteryear may be somewhat chastened by reflecting upon the recent "Jupiter effect" scare.¹

The comet inspired reams of newspaper verse, comic cartoons and postcards, jokes, short musical compositions, and revue sketches. Even Gus Edwards produced a song, "The Comet and the Earth," for the Ziegfeld Follies of 1910. A cartoon in the *Portland Oregonian* suggested that the nation's professional funnymen should offer the comet a vote of thanks. Today Halley's Comet T-shirts are being sold in anticipation of the coming reappearance, but in 1910 comet designs decorated vests, neckties, handkerchiefs, and socks.

The manifestation of interest in the 1910 visit of Halley's Comet that is perhaps least familiar today was the application of the comet motif to advertisements. A sweeping arc of tail, growing out of a bright circular or star-shaped head that usually featured the product, formed an eye-catching design that was used to good effect by many commercial artists.

Because libraries often remove advertising sections from periodicals before binding them, to lessen the bulk of the volumes, many such advertisements have perished; others are preserved only in the pages of newspapers that have been reduced to microfilm, from which it is difficult to reclaim clear, full-size images. That they were quite numerous is implied by the cartoon "Publicité céleste," showing a bemused comet surrounded by a host of imaginative appeals.



Newmark's pure high grade coffee. From the *Los Angeles Times Weekly Illustrated Magazine*, May 15, 1910, p. 640.

How Will It Strike?

That is the question you should apply to your printing: How will it strike those who see it? You can get printing that strikes them all favorably, and that means more profit for you. All you have to do is to call Phone 3296 and our representative will show you samples and quote prices that will strike you favorably.

The Lea-Mar Print Shop
37 East Spring Street COLUMBUS, OHIO

The printer of the *Honey Jar* plays with the notion that the comet might collide with the earth. From the back cover of the May 1910 issue.

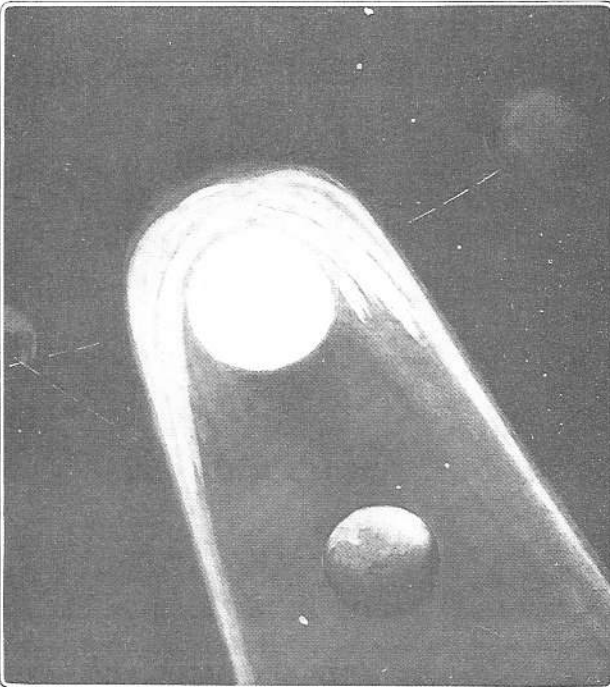
The advertisements reproduced here were found in the course of compiling a bibliography on Halley's Comet. After receiving requests from writers and astronomers seeking unusual illustrative matter, I began to realize their potential usefulness in entertaining lecture audiences and embellishing publications. The accompanying designs are offered as a convenient guide to what has been unearthed so far in the collections of the Library of Congress.

NOTE

1. For a discussion of the prophecies of doom associated with the alignment of the planets, see the *New York Times*, February 14, 1982, p. 28, and March 10, 1982, pp. A10 and A27.

RUTH S. FREITAG is a senior science specialist on the staff of the Science and Technology Division of the Library of Congress. She compiled the bibliography *The Star of Bethlehem; A List of References*, published by the Library in 1979, and is currently compiling a comprehensive bibliography of materials relating to Halley's Comet.

There is No Doubt that the Comet will Not Strike the Earth;



And there is No Doubt that the General Excellence of the
"ILLUSTRATED LONDON NEWS"
 STRIKES THE WORLD EACH WEEK.

ANNUAL SUBSCRIPTION including Christmas Number, 41 Sh. 3d. There are now reduced postage rates to Canada for which the Price 6d. Weekly. PUBLISHING OFFICE: 25, ST. MARKS PLACE, LONDON, W.1. PRINTING OFFICE: MESSRS. LANE, NEWKENT, WY.

The *Illustrated London News* uses a drawing from its issue of April 23, 1910, p. 597, to advertise itself in the *Sketch*, April 13, 1910, p. d.

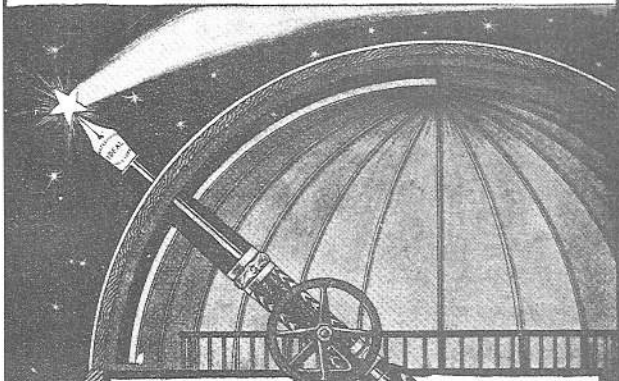
"Comets come and comets go, but our products last" is the message from Seidel & Naumann in the weekly *Illustrirte Zeitung*, March 31, 1910, p. 599.

**Kometen kommen
 Kometen gehen, es bleiben
 aber bestehen**



Seidel & Naumann Dresden

**Waterman's
 (Ideal)
 Fountain Pen**



Fixed and Shooting Stars From **10/6** upwards.

Observers will be keenly alert for the brief progress of the star of the moment—Halley's Comet. But shrewd observers have long noted the fixed star of the pen world—Waterman's Ideal. Many pens are meteors, flashing before the world of writers with a confusing tale of mere assertion; but the fixed and brilliant qualities of Waterman's Ideal are founded on permanent merits which have been tested and proven.

Of Stationers, Jewellers, etc. Booklet post free, from L. & C. HARDMUTH, 22, Golden Lane, London, E.C. (New York: 171, Broadway. Paris: 5, Rue de Hanovre. Brussels: 74, Rue de Four Neuf. Dresden: Pragerstrasse 6. Milan: Via Bossi 4. Vienna: 1, Franzensring 20.)

Waterman's ideal fountain pen, replacing the telescope at this observatory, also becomes a fixed star that compares favorably with the fleeting comet. From *Wide World Magazine*, 1910 (undated advertising section bound at end of volume).



The comet, shedding hairpins and side combs, looks lost among the many advertisements trading on its name and the ultimate catastrophe it was expected to produce. From *Le Rire*, May 21, 1910, back cover.

In ancient times, people thought that when an eclipse occurred a dragon had come to devour the sun. So they screamed, chanted, clashed things together, made lots of noise to scare away the dragon. Well, of course, it always worked. I noticed that cheers and whooping, lots of noise, were sent up by those folks at Flint Creek. I wonder, do you suppose that there is some inherent factor in our genetic makeup that brought out these actions that resemble those of our ancestors?

Odd thing about eclipses. After third contact, most everyone pats each other on the back, packs up and goes home. I decided to stay for the duration. I was taking photometric recordings for I.O.T.A. and USNO. Fourth contact came at 17 44 51.6 UT. The eclipse was a broken annular one in our observation area. Well over 97 percent of the sun's surface was covered at maximum.

It is sad that the national news made no mention of Mississippi. Many valid contributions to astronomy were made in Mississippi that day. It is also sad that the on site television reporter referred to assembled observers as "amateur astrologers." Nevertheless, the eclipse brought forth the strength and purpose of nonprofessional astronomers who contribute so much to the science of astronomy--everywhere.

Eclipse Video Available

by Frank Palma
Owens Planetarium
Pensacola, Florida

A videotape of the eclipse image formed by eyepiece projection on a screen is available. Features: (1) Description of projection system and brief scenes of observers with variety of telescopes; (2) Time lapse views of partial phases starting one minute after first contact with WWV time signals and faint crowd noises on sound track; (3) Details of a sunspot immersion; (4) Four minutes continuous footage during central eclipse, including 11 seconds of broken annularity with Bailey's Beads; (5) Fourth contact with time signals. Length: 13 1/2 minutes. Available in VHS or 3/4" commercial videocassette. \$10 dubbing fee. You supply blank tape. Send blank tape and check or institutional purchase order with production agreement to: ECLIPSE TAPE, WSRE/TV, 1000 COLLEGE BOULEVARD, PENSACOLA, FLORIDA 32504.

PRODUCTION AGREEMENT

THIS AGREEMENT entered into by and between The District Board of Trustees of Pensacola Junior College, Florida, the operator of WSRE-TV (hereinafter "Station") and _____

(hereinafter "Recipient"):

WHEREAS, the parties hereto have agreed upon certain terms and conditions relating to the duplication of the program ECLIPSE recorded by WSRE-TV on May 30, 1984, now, therefore,

FOR AND IN CONSIDERATION of the premises and other good and valuable considerations, Station and Recipient agree and covenant each with the other as follows:

1. Station has exclusive control and possession of videotape made of the aforesaid program.
2. Recipient understands and agrees that Station is able to provide Recipient with a copy of the videotape on condition that Recipient will not utilize the video cassette copy for any commercial purposes. The copy received by the Recipient is to be used solely and exclusively by Recipient for personal and noncommercial purposes.
3. Specifically, Recipient agrees and covenants with Station that:
 - A. The video cassette copy will not be used or offered for use to a commercial television station on a profit making program.
 - B. The video cassette copy will also not be used or offered for use to another educational television station, cable operation or program distributor without the express written consent of Station.
 - C. The video cassette copy will not be duplicated by Recipient or anyone else on behalf of Recipient.

IN TESTIMONY WHEREOF, Station and Recipient have executed this agreement this _____ day of _____, _____.

THE DISTRICT BOARD OF TRUSTEES OF PENSACOLA JUNIOR COLLEGE, FLORIDA

BY: _____
DR. HORACE E. HARTSELL, PRESIDENT

RECIPIENT (SEAL)

IF CORPORATION, FEDERAL I.D. NUMBER

IF INDIVIDUAL, SOCIAL SECURITY NUMBER

UFOs, Space & Humankind:

The Ultimate Frontier

A Planetarium Program for Public Education

by Lee Golden
Daytona Planetarium
Daytona Beach, Florida

There is an ongoing need for public education concerning UFOs: outstanding events in the skies of our planet that are inexplicable in conventional terms. Here, in a two-hour program, some of the astonishing facts and evidence will be provided to help answer that need. Designed expressly for planetarium audiences, the presentation artfully incorporates slides, authentic daylight film, music, lecture and a question and answer period. Authorities and sources cited in this prospectus indicate the direction and scope of the project.

MARGARET MEAD, Anthropologist:

"...YES, there are unidentified flying objects. There are phenomena that, even after the most cautious and painstaking investigations, cannot be explained away. This much, at least, we must accept." (9/74)

L. GORDON COOPER, Astronaut:

"Intelligent beings from other planets regularly visit our world in an effort to enter into contact with us. I have encountered various ships during my space voyages. NASA and the American government know this and possess a great deal of evidence." (L.A. Herald-Examiner 8/15/76)

DR. HERMANN OBERTH, Mathematician:

"Flying saucers come from distant worlds ...These objects are conceived and directed by intelligent beings of a very high order." (International Astronautical Congress, Innsbruck, 8/54)

Through a balanced, entertaining format "USOs, Space & Humankind" attempts to provide a thoughtful overview of the following topics:

(1) What is a UFO? We shall examine the evidence reported by witnesses, where and when the sightings occurred, and correla-

tions regarding speed, maneuverability and construction of the spacecraft. Our study is concerned with factual evidence of UFOs and a point of view akin to that of Dr. Margaret Mead, as follows:

"...people still ask each other: 'Do you believe in UFOs? I think this is a silly question, born of confusion. Belief has to do with matters of faith. It has nothing to do with the kind of knowledge that is based on scientific inquiry... We should not bracket UFOs with angels and archangels, devils and demons...We have to begin with an entirely different set of questions: What is it? How does it work? Are there recurrent regularities? (Redbook, 9/74)

(2) Sightings from ancient civilizations to the present. We shall examine translations of ancient texts, scientific observations from the 17th through 19th centuries, and a sample of the hundreds of thousands of 20th century sightings reported in over 140 countries by credible witnesses from all walks of life.

(3) UFOs and the astronomers. A number of noted astronomers over the centuries have sighted UFOs. Included are Dr. H. Percy Wilkins, former head of the British Selenological Society; Dr. Seymore Hess; Dr. Frank Halstead, for 25 years head of Darling Observatory; Nobel Prize winner Bart Bok of Mt. Stromlo Observatory in Australia; and Father Benito Reyna, Director of Adhara Observatory in Argentina, who also photographed UFOs.

Eighty percent of 1,356 astronomers polled by Stanford's Dr. Sturrock believe UFOs deserve further scientific study. Sixty-two of these stated they had either sighted a UFO or had recorded possible UFO-related events on their instruments.

(4) UFOs and the space program. On various occasions U.S. astronauts have sighted extraterrestrial craft during space missions, including L. Gordon Cooper and James McDivitt. Photographs and films have been taken.

(5) Reports and evidence from the general public. A broad cross-section of citizens have reported sighting these craft. Authentic film footage, taken in broad daylight at close range, will be shown. The speakers, Thomas and Lenore Heiman, have

also observed remarkable events along with other witnesses.

(6) Conclusion: Where do we go from here? Consideration will be given to Space Colonies and the work of such pioneers as Princeton's Gerard K. O'Neill. What might be the interactions of earth's space colonists with the occupants of extraterrestrial craft? What are the prospects for peace in space? What can a concerned citizen do? In the event of a sighting, how may we deal effectively with our own perceptions? How can we share our experience with others? Where do we turn for reliable information and further study? How do we relate to government agencies and the news media?

ABOUT THE SPEAKERS:

THOMAS H. HEIMAN, a Yale graduate with an Art major and Anthropology minor, is known internationally for his lectures and classes concerning extraterrestrial anthropology and evidence of UFOs. In 1974 he was awarded the first California teaching credential in the field designated as "UFOs and Related Technologies." As a student of these events since 1965, Mr. Heiman went on to share his experiences and studies with audiences at major universities, schools, Air Force bases, law enforcement agencies, on TV and radio throughout the USA, Mexico, Europe and Japan. On two occasions he conferred at the White House during the Carter administration, and was asked to present his work to distinguished officials at the United Nations. His professional background includes work as a Field Editor for Random House-Knopf; a poet/musician; a high school art and drama teacher, and owner of a printing company.

LENORE L. HEIMAN, together with her husband Thomas, has been a lecturer and researcher in the field of extraterrestrial studies since 1972. She has been interviewed on radio and TV on numerous occasions, and has taught Adult Education Classes entitled "UFOs, Space and Humankind." She and her husband are the co-creators and producers of this planetarium program.

For more information, or if you would like to bring this program to your planetarium, please contact: Lee Golden, Museum of Arts and Science, Daytona Beach, Florida, (904) 255-0285; or Thomas and Lenore Heiman, PO Box 3554, Deland, Florida, (904) 736-8212.

Taking Guesswork Out of Constellation Outlines

by Jimmy Westlake
The Rollins Planetarium
Young Harris, Georgia

Over the years I've read about and tried many different methods for producing constellation overlays and line drawings. All of these methods have one thing in common--they all require some form of guesswork that introduces error into the final product. To overcome this, I've dreamed up a simple but foolproof procedure that allows pinpoint accuracy. It all hinges on the fact that the light rays leaving a slide projector follow the exact same paths as light rays entering the projector. So, by using your projector as a camera, you see the starfield just as your projector sees it! What could be easier?

Here are some of the major items you will need to follow my procedure:

35mm camera w/ 50 mm f.1. lens
Tri-X 35mm film
Kodalith 35mm film
Weis plastic slide mounts (or equivalent)
Slide projector
Darkroom enlarger w/ 50 mm f.1. lens
Copy stand

Now, follow these steps to get the best constellation outlines you've ever seen.

1. Put a slide of any object into your slide projector and bring it to a sharp focus. Any projector lens will do, but I use a Buhl wide-angle lens that covers nearly 1/4 of the dome. Remove the slide and replace it with an empty slide mount. Turn your projector on very faintly to see what are of the dome is covered by the empty slide.

2. Move the projector and/or the starfield until the desired constellation fits entirely within the projected slide frame. You might have to turn the slide vertically or horizontally depending on the constellation. Jot down the exact heading, daily, and latitude positions so you can duplicate the setup at a future time.

3. In your darkroom, cut a piece of unexposed Tri-X film and mount it in your slide mount, preferably a Weis mount because it has pins to hold the film securely in place. Be sure you can tell by feeling the slide mount which is the emulsion side of the film! A small piece of tape strategically placed works well. When cutting your film pieces, remember that the concave side is the emulsion side. Place your mounted piece of unexposed Tri-X into a light-tight container and return to the planetarium chamber.

4. In total darkness (not even the stars) remove the empty slide mount from the projector gate and insert the unexposed Tri-X slide with the emulsion side facing the dome. Be sure that it is oriented vertically or horizontally as needed.

5. Next, turn the stars on and expose them for about 5 minutes with no stray light. It's a good idea to turn off the slide projector at the switch since the bulb sometimes glows faintly even when dimmed out. Turn the stars off and place the now exposed Tri-X slide into its light-tight container. Develop your starfield negative in a small tray or beaker in total darkness. If you develop more than one at a time, be sure that the film pieces do not come in contact. Follow developing instructions provided with the Tri-X film.

6. Place the unmounted starfield negative into a photographic enlarger equipped with the same focal length lens that your 35mm camera has (Mine has a 50mm focal length lens). Place the film plane at some standard height (I use 50 cm) and focus the starfield onto a piece of white paper. Use a pencil to lightly mark the positions of the desired stars on the paper. Be sure that the negative remains 50 cm above the white paper!

7. Now have one of your full time staff artists (Ha!) draw the constellation outline around the stars. Use a fine black felt-tipped marker to do your final drawing. There's no need to do one drawing at a time. Your starfield picture might contain several constellations. Draw them all on one sheet of paper and later you can opaque out the unneeded ones or show them all at once.

8. Load your 35mm camera with Kodalith film and place it on your copy stand.

Adjust it so that the film plane is exactly 50 cm above your drawing. The film plane is marked on the top of most cameras. Be sure that the camera lens has the same focal length as your enlarger lens. If not, the final picture will not be the correct size. Most cameras and enlargers come with a 50mm lens as standard equipment. Now snap your picture and process your Kodalith.

9. Mount your Kodalith slide and place it into the projector. If the projector and starfield have not been moved, it should only take a few minor adjustments to position the film within the mount and make it fit over the stars. Tape the film into place, close the mount, and enjoy the results!

I've used this method for very intricate drawings as well as simple lines connecting the stars with equally good results. In one show, I needed to circle about 20 stars in different areas of the sky. I accomplished this by using two projectors with wide-angle lenses and using the procedure I just described. There may be many other applications that you can think of where a precise fit over the stars is essential. If so, I haven't found a better method to take the guesswork out and put the precise fit on the dome.

Minolta Infinium Planetarium

Selected for

Tsukuba Expo '85 Exposition

by Kosuke Sasaki
Sasaki Associates
Holbrook, New York

The world's largest and most advanced planetarium, the "Minolta Infinium," will be displayed at the 1985 International Science and Technology Exposition in Tsukuba, Japan.

Developed by Minolta Camera Company, Ltd., Osaka, Japan, the planetarium is one of the outstanding scientific developments selected by the Japanese government for the exhibit. More than 40 countries will be

represented at Tsukuba Expo '85, the first world exposition of science and technology.

In announcing the selection, Mr. Hideo Tashima, president of Minolta, said, "It is indeed an honor to have the 'Minolta Infinium' included in such a prestigious exhibition as Tsukuba Expo '85. We are also very pleased that the planetarium will become a permanent facility after the exposition closes.

"The 'Minolta Infinium' incorporates the latest optical/electronic/mechanical technology. It demonstrates our company's commitment to the advancement of science, technology and image-making.

"In the near future," Mr. Tashima concluded, "'Infinium' series planetaria will also be available to universities and scientific institutions. We will be able to manufacture the planetaria in approximately one year after receiving exact specifications."

Guide to Outer Space

The "Minolta Infinium" has the world's largest planetarium dome, 25.6 meters (85.5 feet). Here audiences have the unique visual opportunity--to experience the mysteries of outer space. In addition to viewing conventional astronomical images, audiences personally encounter simulations of outer space from any fixed point in the solar system. Audiences can also experience the sensation of moving through space at ultra-high speeds on a starship. The "Minolta Infinium" features the first separate projection system for viewing the sun, moon and several planets: Mercury, Venus, Earth, Mars, Jupiter and Saturn.

Star Ball Projection System

A fixed-star projector utilizes a single-sphere "star ball" with a single light source. Although the sphere is only one meter (3.3 feet) in diameter, the "star ball" also houses an extraordinarily powerful light source for the projection up to 23,000 stars. In addition, the "Minolta Infinium" includes a full range of highly accurate, multi-color projection functions for display of astronomical images.

For more information contact: Kosuke Sasaki, Sasaki Associates, 90 Arch Drive, Holbrook, New York 11741.



STARS Planetarium
by Regina Cates
Ocean Springs, Mississippi

The oldest planetarium in Mississippi does not fly Cinema 360 cameras in space. Its sole reason for existence is education. STARS Planetarium in south Mississippi is a facility of the Jackson County School System. Its origin in the mid 70s is due largely to a singularly dedicated administrator who received the government funds under Title III ESEA for a pilot program in which a scientific and multimedia facility would be built for the students of the Jackson County School System.

STARS Planetarium opened its twenty-four foot dome with its Viewlex Apollo II in 1975 to those county students and then expanded to allow coastal and surrounding area schools to reap the benefits of what has turned into an excellent educational program. To attest to this claim, last year we "shuttled" over 14,000 visitors through the facility, most of them students. This may sound paltry to some, but consider (a) STARS has a seating capacity of 50, (b) it is located in an extremely rural area and hard to get to, (c) evaluations are consistently positive, (d) we are quality.

Since this school facility is a one-person operation (I do have a receptionist who, bless her buttons, stays on the phone making reservations and fielding calls) we cater to groups during school hours and after hours by special arrangement. Public programs are scheduled frequently. All shows are in-house productions geared to specific grade levels. With a variety of programs we are able to meet the requests of teachers when their classes visit the facility (programs are scheduled by teacher request). After night programs there are usually observing sessions using our Celestron 8-inch and Astroscan 2001 telescopes, and other scopes brought by volunteers.

The physical plant itself is small. In addition to the star theater, there is a classroom, lobby, two offices, and restrooms. The director's office serves as the darkroom, also.

Though the planetarium belongs to the school system, we are not funded. There is no budget. Working capital comes from the fee charged to visiting groups. This money is used to produce star shows focusing primarily on astronomy education. We also produce historical, literary and special topical programs. Every penny counts!

Since 1975 STARS Planetarium has had many highs and lows (more lows than we care to count). After a wrenching, shaky start when the original director didn't know what you did in one of those things (she hated kids, too), STARS had to confront and combat almost hostile school board and community attitudes. It has had to constantly keep itself in the public eye to build the respectable and creditable reputation we now enjoy. The creation of the Planetarium Science Class by former director Jim McMurtray in 1977 was the first step in this improvement. We have continued the highly successful class for the brighter high school students.

STARS was almost closed in 1981 when it was between directors. Fortunately, a small group of planetarium groupies, myself among them, convinced our local school Board to keep the facility open. We won. I was recommended for the job, accepted it, and the groupies have become the Jackson County Astronomical Society. JCAS now handles special observing sessions and public star parties in partnership with the planetarium. Because we have become serious

about the heavy scientific astronomical activities and informing the public of the events and data, a home built 16" Schmidt/Cassegrain has been donated to the planetarium. JCAS has done the fieldwork for the proposed observatory. The devotion of these people does not go unrecognized. We exhibit their artwork and photography, occasionally provide the programs for monthly meetings, or contact speakers for them.

NASA/NSTL in Bay St. Louis, Mississippi, has increased their support of the planetarium. There are plans to build an exhibit for STARS that will appear in the new visitors' center. We also were recently commissioned to produce a program highlighting NSTL's contribution to the development and testing of state-of-the-art rocket engines.

These are some of the more visible events which have enhanced our standing in the school system and community. Most importantly, though, is the continuing production of good educational programs for all age groups. We have found interest and pride in the planetarium growing.

With a more positive image, STARS Planetarium can keep its doors open and continue to provide quality programs (like "STARLIGHT") and sound educational instruction to its patrons.

Quality survives.

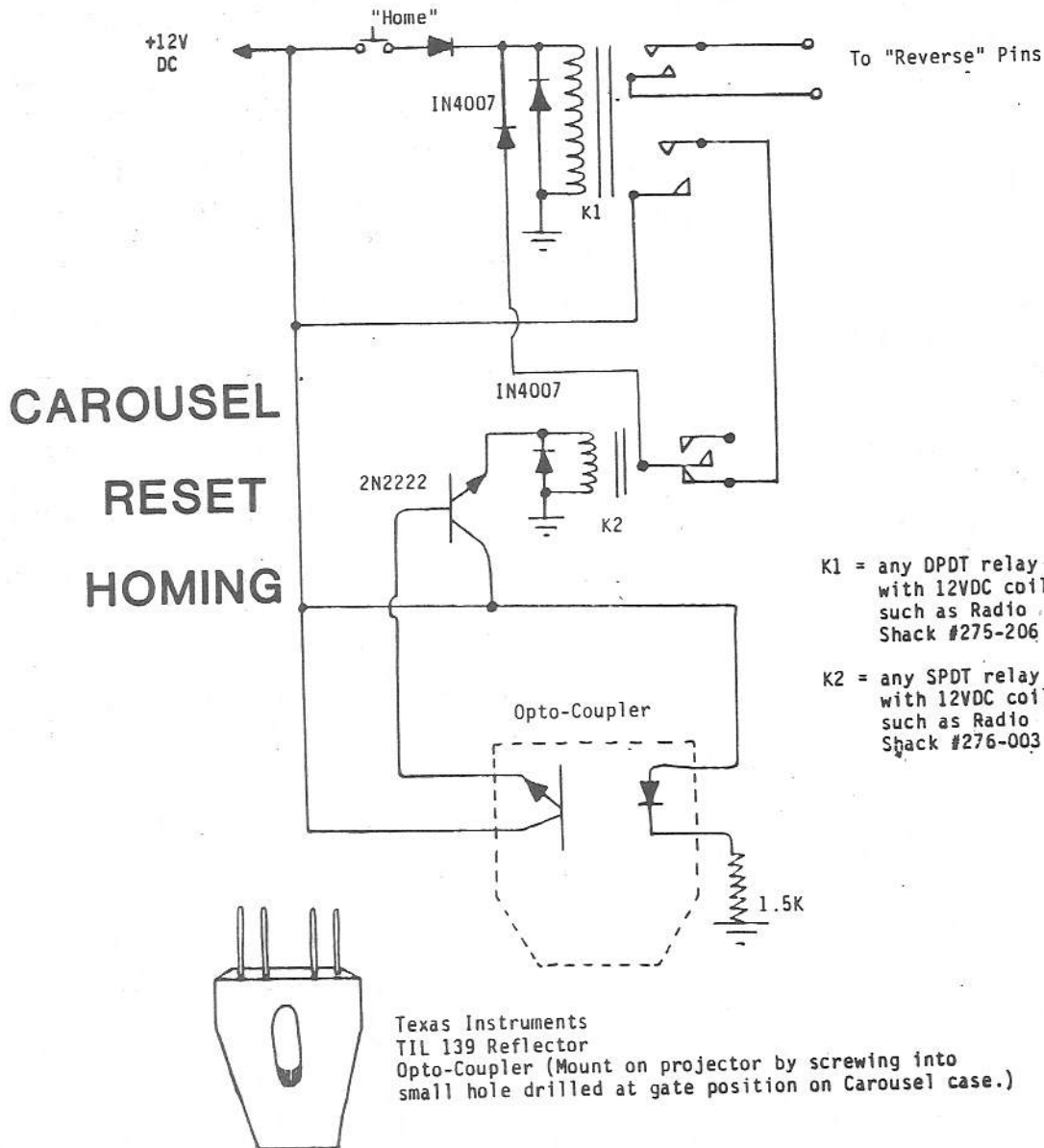


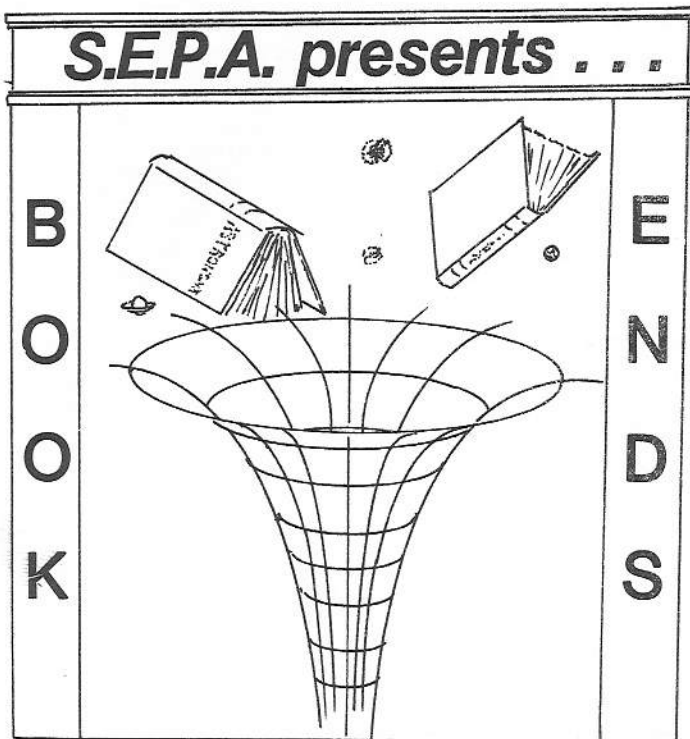
Bishop Planetarium has immediate opening for Artist/Producer. Production responsibilities include all graphics and artwork for planetarium and museum, assisting in general production of starshows, and occasional production of laser shows. Other duties include photography, operation of observatory, presentation of public starshows and laser shows. Background should include knowledge of and experience in various graphic and art techniques, photography, astronomy and other general planetarium principles. Some evening and weekend work is required. Salary \$14,000+ depending on qualifications and experience.

Contact: John Hare, Director, Bishop Planetarium, 201 10th Street West, Bradenton, Florida 33505, (813) 746-4132.



Instead of a microswitch-and-bumper arrangement for sensing the "Home" position, this Carousel-homing circuit uses a reflective-type opto-coupler to sense a piece of reflective tape on the side of a Carousel tray to indicate "Home". Pushing the "Home" button causes the projector to back up (always home in reverse-your projectors will live longer) to the piece of reflective tape (silver opaquing tape works well) on the side of your Carousel tray. Then the projector stops and is reset automatically.





by Regina C. Cates
STARS Planetarium

The Hidden Sun, Solar Eclipses
and Astrophotography

by James Lowenthal, New York, NY, 1984.
ISBN-0-380-86959-4, 106 pp.
softcover \$5.95 c 1984 Avon Books.

The day after the May 30, 1984 eclipse I was in a bookstore looking through the science section when I spotted this small book neatly tucked away on its shelf. Its title screamed at me so I picked it up and wanted to scream at myself. This book was what I had needed before the eclipse. I bought it anyway.

Astrophotography is a challenge. Anyone who is serious about this area will benefit in big ways from this book. In an easy to understand manner, Mr. Lowenthal gives clear and concise advice on film use, photographing the sun, star trails, the moon and the planets. He also offers some important methods for capturing the neat deep sky stuff. After each chapter there is a summary detailing equipment and techniques.

The book is a how-to basic containing some astronomy, lots of easy to use equations,

many fine illustrations and a good glossary. I have found that my plain constellation slides have improved. I can now loan these to the second grade teachers without embarrassment.

If you've tried and not succeeded in capturing some of the night sky objects on film, give some thought to reading this book.

COPIES OF GROUP PHOTO

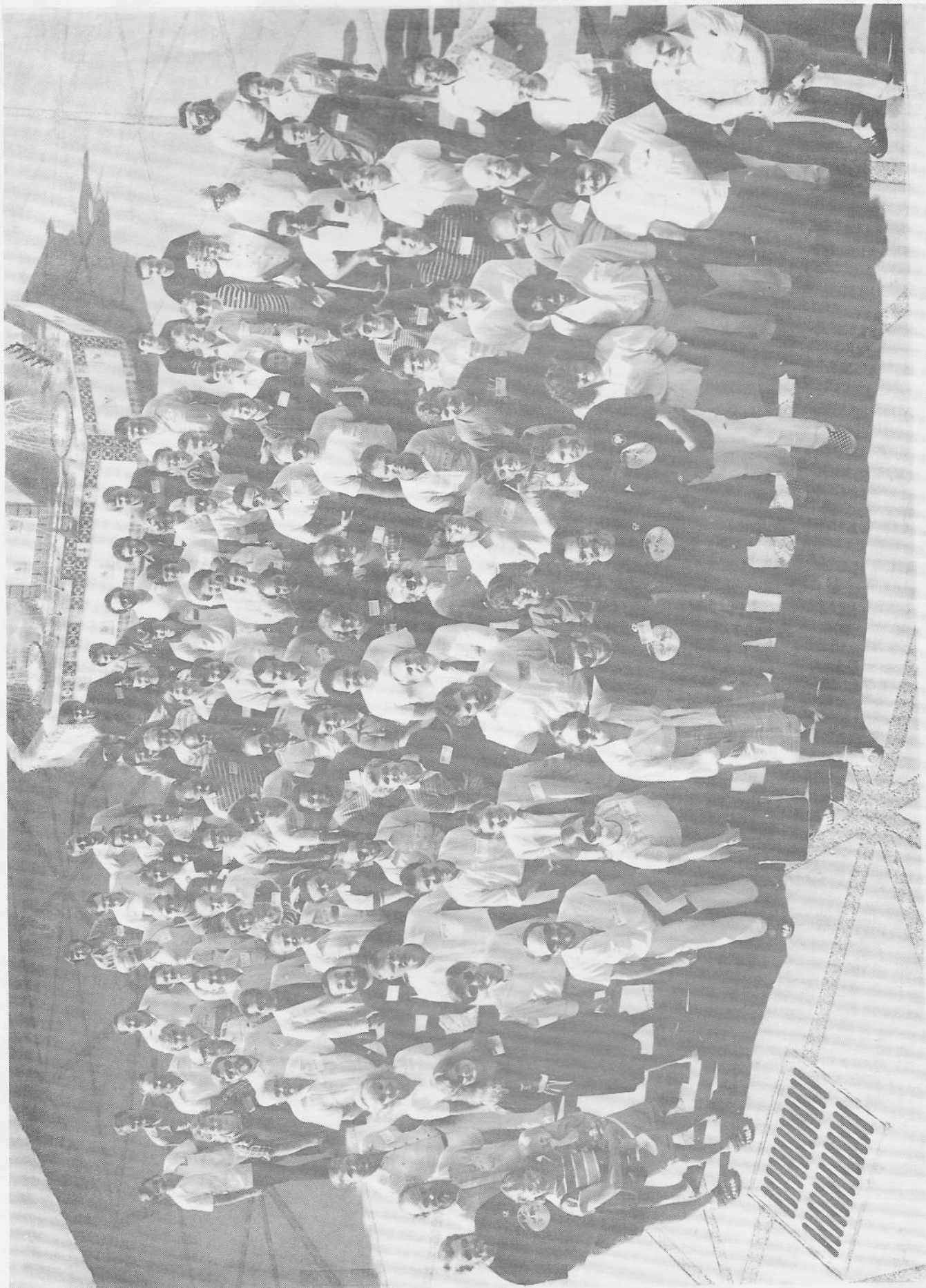
If you were a registered delegate at the 1984 SEPA Conference in Bradenton, Florida, and did not receive a copy of the Group Photo, please write to John Hare at the Bishop Planetarium for a copy. (See inside front cover for John's address.) A copy of the photo appears on the inside back cover in this issue.

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Once upon a time in Bradenton....