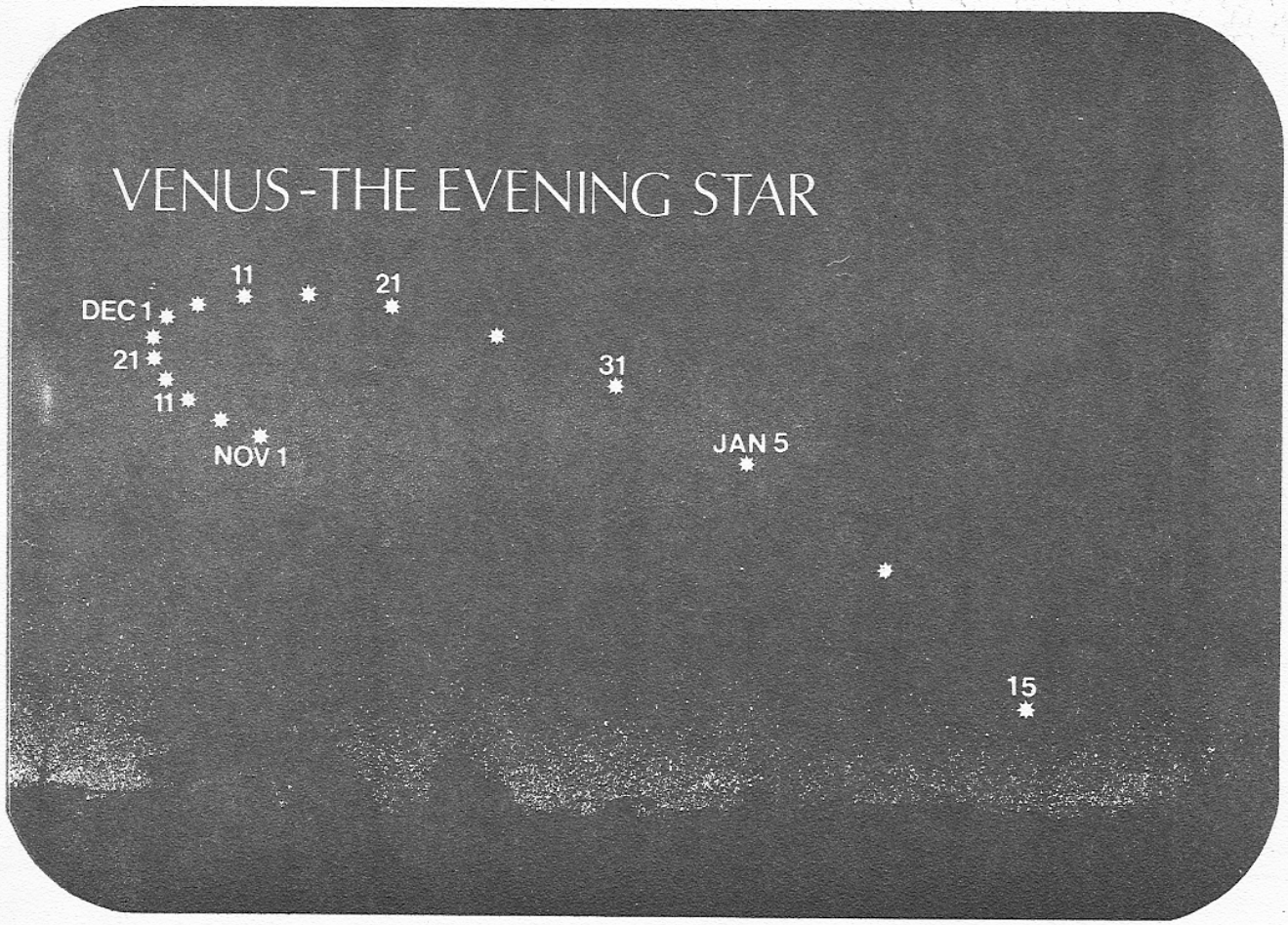
SOUTHERN SKIES



Newsletter of the Southeastern Planetarium Association

CONTENTS

COVER ILLUSTRATION: Positions for the remaining two-and-a-half months of the current evening apparition of Venus are plotted at 5-day intervals from November 1, 1981 to January 15, 1982. The view is to the southwest at the end of civil twilight (sun altitude -6°) or about 30 minutes after sunset. Greatest eastern elongation is on November 10th and greatest brilliancy on December 16th, at magnitude -4.4. In January, Venus will quickly dart into the eastern predawn sky.

Graphics by James Hervat
Calculations by David Duszynski

Southern skies

SOUTHEASTERN PLANETARIUM ASSOCIATION

Vol. I, No. 3 November 1981

MESSAGE FROM YOUR PRESIDENT

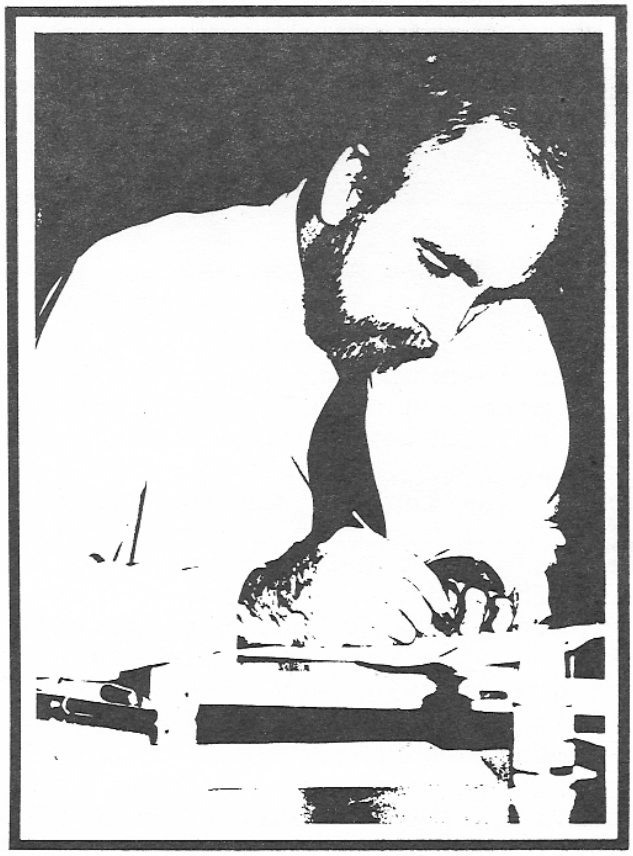
Maybe it's the Monday morning blues that has me in the doldrums as I write this. Or perhaps it is a reflection of the somber mood of Cosmos currently running in our theater. Whatever the reason, I've decided to get off my chest a bunch of 'stuff' which has been building up inside for some time now. So kindly bear with me and I will attempt to end this tirade on an 'up' note.

(If you have never worked in a 20 ft. dome, you probably never experienced this one.) You are at an IPS convention attended by several hundred delegates. You casually strike up a conversation with someone you never before met. Invariably comes the one question you secretly hope will not be asked:

"And what size of dome do you have?"

You have three options: (1) quickly change the topic, (2) make a fast mental conversion from 20 ft. to millimeters so that your answer will at least sound impressive, or (3) you answer honestly and wait for the reaction.

Bravely, you choose the last route and watch as your conversation partner with nose in the air turns on his heels and walks away as though he just learned that you have contracted some catastrophic disease. Does a lot for the ego, right?



A few of us in Florida have the solution to this situation. It came to us one night as we were sitting on the roof of a house, having consumed a quantity of spirited liquid material. (It is amazing the volume of philosophical enlightenment which can occur during such moments.) The ultimate answer in quasi-Freudian terminology is this:

IT IS NOT THE SIZE OF YOUR DOME.
IT IS THE LENGTH OF YOUR PROGRAM!!

Impressive, right? I think I want that etched on my tombstone.

And speaking of program, have you ever been the recipient of criticism from your peers which could go something like this: "Horrors, you mean to tell me that you run only LIVE shows in your theater? (or substitute the word CANNED for LIVE--the slur is interchangeable.)

Before I attempt to respond to the above, permit me to delve into ancient history. Some time ago, in the year 3 BP [Before Planetarium] I was teaching Physics and IPS at a local high school. It was during an era when the method of LAP teaching was relatively new, becoming the 'in' thing. (LAP: Learning Activity Packages--with pre-test, reading assignment, lab experience, experimental evaluation and post test.) The key to the method was in allowing individual groups to progress at their own rate.

I went into the experience with an open mind and even had the luxury of a physics major intern to assist. The class drove us both nearly insane. The lack of control was most unnerving; too much diversity happening all at once. Perhaps to some the method has value and can effectively work, but I personally finished the year more drained and let down than by any other professional experience. I left with a closed mind.

The point that I'm trying to make with all of this is as follows: In the planetarium, there is no RIGHT way of presenting shows. Some of us are more comfortable with live lectures. Others prefer the canned show approach. Still others enthusiastically support the audience-participatory type of programming.

The trap that some of us fall into is that we have become so ingrained to a certain method, we might have a tendency to be critical of any other approach. Does it really matter?

Perhaps one more example might be of benefit. The year Mike Hutton hosted the SEPA conference in Cocoa I had put together a program on 3-D which was conducted live in the theater. (I wasn't alone on this. That year, for some strange reason the 3-D bug bit a number of Florida planetariums.) Mike heard of my approach and asked to have the program as part of the conference, representative of school programming. Still he had a problem. His theater understands only one word: COMPUTER. The show had to be canned with precise cues programmed in advance.

So I rewrote the show as a 'canned' dialogue interchange between two men discussing 3-D and produced a corresponding soundtrack. Students traveling to my theater that year had the opportunity of being exposed to two differing versions: first live, then later canned. I can honestly report that I could not discern any difference in student reactions!

Thus, what I am really trying to infer with all this verbage is this: Run your theater in a fashion which is most comfortable for you and most exciting for the audience you serve. Be proud of the hard work you are doing. At the same time, have respect for the professional who approaches the task of presentations in a different light. The chances are, you are both doing an outstanding job.

Now, on to business. Recently, I received a letter from Mr. Bill Peters, President of IPS. As many of you know, Bill Lazarus is no longer in the planetarium field. In the past, Bill L. handled the lion's share of the work in compiling information for the planetarium directory published by IPS. With Bill gone, the directory is floating around in limbo. If any of you have time and the incentive to take on this task, please contact me or Mr. Peters. IPS is asking for our help.

And in a final word to the wise of these days, if you ever come down

to Florida and visit my modest installation here at Howey, please leave your tape measure home.

Take care,

Mike

A Signed, Live Planetarium Show for the Hearing-Impaired: Its Development and Success

By Jon U. Bell
Peninsula Planetarium
Newport News, Virginia

Over the past two years, the Peninsula Planetarium has developed a "Sky Tonight" style program for the hearing-impaired, which uses the communication techniques of signing and captioning. The program is presented to the students live, by the lecturer, whose narration is interpreted by a qualified signer. Single word or phrase captioning is used during the show only to introduce new or difficult words (see Fig. 1).

Our first decision regarding the show's production was on what audience to target it for. In the Tidewater Virginia community, the deaf and hearing-impaired are either concentrated in special schools, or mainstreamed in standard classrooms. We wanted as homogeneous a group as possible for our first experiments, so we opted for the special school groups.

We have a 30' dome with concentric bench seating, and all the lecturer/interpreter visibility problems that that entails. Therefore we felt the group number should not exceed 20. The placement of the group, the lecturer, the interpreter, and the dome location of the captions can be seen in Fig. 2.

But was using an interpreter the best possible way to communicate with the students? Show format became one of our biggest concerns.

SAMPLE CAPTIONS
(to be used in conjunction with a signing interpreter)

WELCOME		POLARIS
PLANETARIUM		NORTH STAR
STARS		LITTLE DIPPER
PLANETS		URSA MINOR
SUN & MOON		BEAR LITTLE
CONSTELLATIONS		LITTLE BEAR
PLANET!		URSA MAJOR
MERCURY		BIG BEAR
VENUS		ARCTURUS
MARS		WHITE HAWK
JUPITER		BOOTES
SATURN		ICE CREAM CONE!
PEGASUS	[Autumn &	CORONA BOREALIS
BASEBALL DIAMOND	Winter]	NORTHERN CROWN
ANDROMEDA		LEO THE LION
TELESCOPE		REGULUS
ANDROMEDA GALAXY		DENEBOLA (LION'S TAIL)
200 BILLION STARS!		HERCULES
CETUS		SUMMER TRIANGLE
ORION		VEGA
BETELGEUSE		HARP
RIGEL		ALTAIR
TAURUS		EAGLE
ALDEBARAN		INDIAN ARROWHEAD
BULL'S EYE		DENEB
SIRIUS		CYGNUS THE SWAN
CANIS MAJOR		NORTHERN CROSS
DOG BIG		MILKY WAY
BIG DOG		GALAXY
CANIS MINOR		SCORPIUS
LITTLE DOG		ANTARES
PROCYON		FALLING STAR
GEMINI		SHOOTING STAR
CASTOR & POLLUX		METEOR
BIG DIPPER	[Spring &	FIREBALL
POINTER STARS	Summer]	

Fig. 1: This list is by no means all-inclusive, and should serve only an an example of what words could be used.

Some new words were created in sign for our show. How do you say "Planetarium"? Here was our answer.

STAR MAKING MACHINE

Similarly, "falling" or "shooting star" was newly created by our interpreter.

(All artwork by the author)

Several options were available, from taped captioned to taped signed shows, live captioned, or live signed performances.

We rejected the idea of a fully captioned program. The pace of such a show can easily become tediously slow. And often, captioned sentences are beyond the audiences's learning skills.

A live show seemed to us to have distinct advantages over either the signed or captioned taped performance in that it can be tailored by the lecturer as to length, content, or learning level. It is also spontaneous, and is personally more rewarding to the lecturer. But it is also more difficult to present, at least the first couple of times.

An outline of the show's development must be written, and then memorized. Simple captions (an option) for new or difficult words must be made into slides, and then, like the show's outline, memorized by the lecturer. A dry run with the interpreter before the group's visit is essential! Correct sentence structuring and lecturing style plays an important role in the show's effectiveness, and the interpreter can usually be helpful here in determining which phrases or show developments work well, and which don't.

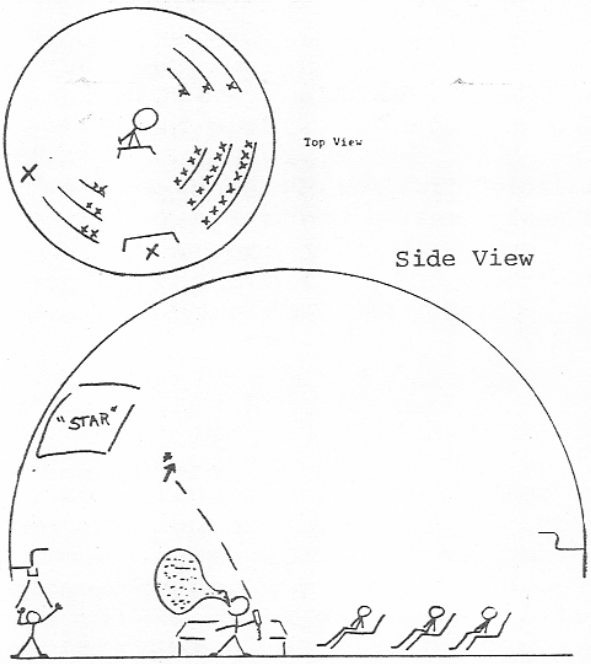


Fig. 2: Logistical locations of the participants

Storytelling as a lecturing style works quite well, particularly those stories tied in with the mythologies of the planets and constellations. Also, storytelling becomes very descriptive and expressive when signed, and as an art form by itself, is beautiful to behold (see Fig. 3). Different stories are told, according to seasonal changes of the sky and constellations. And there is often the opportunity in these stories to work in a visual pun or two, if desired by the lecturer. Signed puns are just as good (or bad, we suppose) as spoken ones (see Fig. 4).

The next problem we faced was in trying to find an interpreter. Hiring a staff interpreter seemed costly and impractical; it was therefore decided to offer the program to groups who could provide their own interpreter. In our first programs, Elizabeth Jones of the Newport News School System served admirably in this capacity.

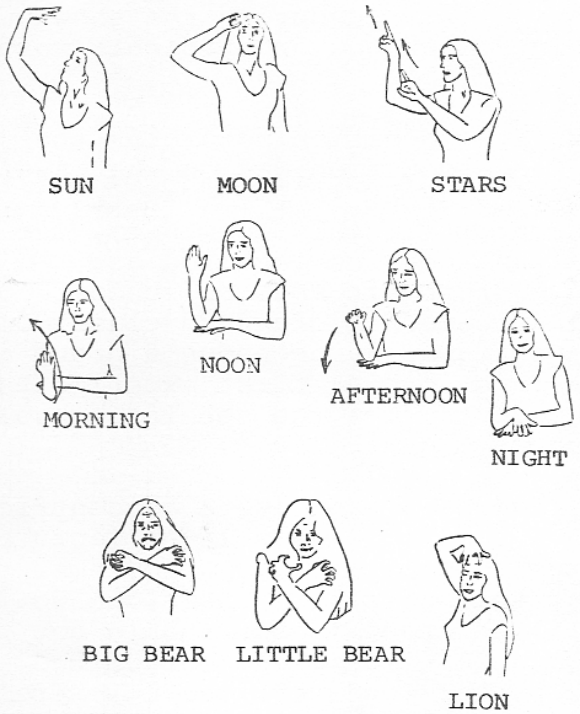


Fig. 3: Expressive signs

Another problem: how do we make the interpreter visible in the dark? We had to illuminate not only the hands, but the arms and face of the interpreter as well, as these

parts of the body also need to be seen for effective signing. Using fluorescent paints or chalk and black lights was first suggested, then rejected because of its potential danger to the signer.

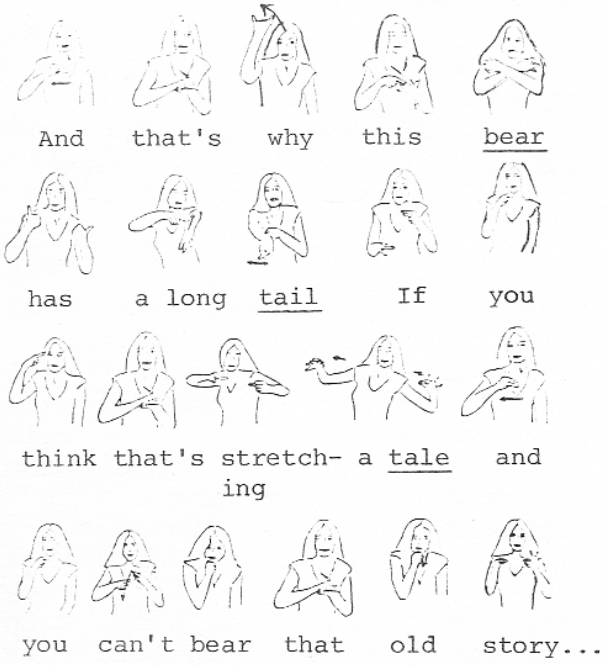


Fig. 4: A visual pun

Phosphorescent paints were considered, and even used for our first performance. The paint, mixed with cold cream (this stretched out the paint's use and made it easier to remove) was applied to the interpreter's face, arms and hands. This took about half an hour. Then we exposed her to strobe lights, and this really made Elizabeth glow in the dark! The effect was a little unsettling, however; she took on a very ghostly appearance and gave us something of a fright. The kids, of course, loved it. Still it seemed to us that there must be a better, easier way to illuminate our signer.

Using a red incandescent light had been in the back of our minds, but we worried about its being too bright and washing out the planetarium sky. Still, it was worth a try.

We mounted a 45 watt lamp on the spring line above the interpreter (see Fig. 5). A special cover which allowed the light to shine only in one direction was placed over the lamp, and a red filter was placed over the aperture. The whole assembly, pointing downwards, allowed the interpreter to be seen without interfering with the dome's darkness. The night sky effect remained intact. With the lamp attached to a dimmer switch, we were able to control the amount of illumination as well, dimming it when we moved from "city" to "country skies" as the students' eyes became dark adapted. This technique was simple, and worked admirably.

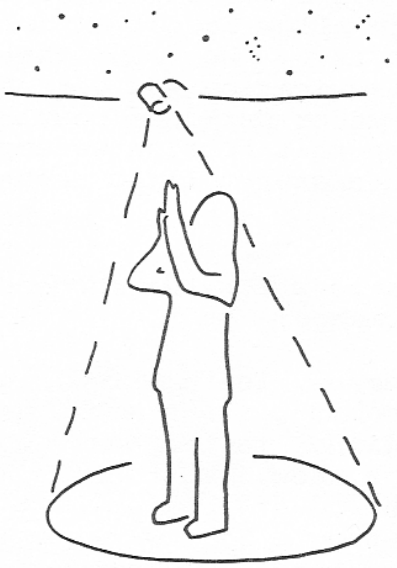


Fig. 5: Interpreter and red lamp location

We designed the programs to last from 35 to 45 minutes, and to cover a typical live planetarium presentation, beginning with an introduction to the room and its star projector. We then went from a sunset to a city sky interpretation of bright stars, moon and planets, then moved to darkened country skies and the constellations. Deep sky sights and ephemeral events, such as meteor showers, were covered as well, before the sunrise that concluded the show. During the program we emphasized the visual medium as much as possible, using our best effects, from setting suns and evening glow to city panorama, spinning

galaxies, constellation outlines, fireballs and planet close-ups. In this way we were able to use the students' reliance on visual information to provide much cognitive and affective stimulus.

We wanted to give our audience a chance to ask questions and think up answers to some of our questions about the sky. We weren't sure, however, where would be the best place in the show for this activity. By experimenting with the group, we found them most responsive to interaction during the beginning and end of the performance, as might be expected, and also during the city night sky identification. There was still enough ambient light at this time to allow facial expressions to be seen. We found that two-way communication was virtually impossible under darkened country skies, so in this section we emphasized lecture/storytelling techniques.

A few suggestions for the success of your performance:

*By all means, learn a few signs. Direct communication with the deaf audience is the best way to conduct a show. Most colleges offer introductory signing courses taught by qualified instructors, and building a vocabulary of signs poses no great difficulty. (In taking my first signing course, I was struck by the pictorial logic of the signs, and especially by the astronomic connotations of many of them--see Fig. 3.) At the very least, have your interpreter teach you how to say "Good Morning," followed by an introduction of yourself.

*There are two major schools of signing--one uses Signed English, which is generally what hearing people learn. It follows standard English grammatical usage. The other school is called Amslan (American Sign Language) and this is generally used by the deaf or hearing-impaired among themselves--it does not follow standard English sentence structure--adjectives, for instance are often placed after the noun. On the caption list (Fig. 1) you'll note the phrases, "Canis Major," "Dog Big," and "Big Dog"--likewise the same for "Ursa Minor," "Bear Little," and "Little Bear"--we used these caption series to make the transition from the reversed Latin to Amslan, and from there into standard English.

*Most of the children we've dealt with have had severe hearing impairments, but are not totally deaf. Therefore, music is used for our performances, from walk-in to sunset, etc. One mistake we made the first time was in cranking up the volume of the music. This was painful both to us and them, especially if they were wearing hearing aids. Keep the music at an acceptable volume.

*It likewise isn't necessary to shout, but do speak clearly and succinctly, keeping your face and mouth in view of the audience where possible.

*Always talk with the handicapped individual directly, not in the third person. Make eye contact with them, not the interpreter.

We have found the experience of working with these students rewarding and delightful, and hope to have many more such activities in the future (Fig.6).

The man put the sun up in the sky. It was dark. An arrow pointed to stars. The sun came up at the end. The snake died. We saw snake bones and snake skin. The rabbit was black. We saw a skunk. The rabbit was scared. We saw a dead duck and a dead Fox. We Fed live ducks.

Dear Mr. Bell,
You made it night and morning. You made it look like Outside. Leslie

I liked the arrow pointing to the stars. I liked the beautiful colors in the universe. I liked the flying horse best. I like to see the sun go down. I liked to feed the real alive ducks. Thank you for letting me come visit. I had a real good time.

Your friend,
Tammy

Fig. 6: In the responses and than-yous from the students (who also saw some animal shows at our Nature Center), it is obvious how important the visual medium is to them. It is also obvious that these are bright, intelligent people who deserve not to be subjected to prejudicial class distinctions.

NAVA-81

By Phil Groce
Alexander Brest Planetarium
Jacksonville, Florida

The National Audio Visual Association sponsors a yearly trade convention for the seller, buyer and user of audio-visual equipment.

The latest in A.V. computer hardware were the showpieces for this year's 42nd annual NAVA Meeting, January 14-19, 1981 in Dallas, Texas.

Over 8,000 A.V. people attended, seeing over 2500 samples of A.V. equipment from 311 companies.

"NAVA-81" was the most useful conference-convention, I have ever attended. The three days I spent talking to salesmen and seeing multi-media shows was like being turned loose in a candy store.

And as much as I love planetarium conferences, I fear many of them have become mutual admiration gatherings with many of us giving papers and demonstrations that have been given before.

And while many of these messages ring of constant truth, I find many planetarians, myself included, are woefully ignorant of the new technologies available from the audio-visual industry.

The NAVA-81 experience taught me that the equipment and the production techniques I use are primitive compared to what is available at the A.V. market today.

In fact, attending a NAVA meeting is a lesson in humility. Until NAVA-81, I was proud of my hand-built special effect projectors and I was convinced that there were only a handful of companies that could automate my planetarium.

Until NAVA-81, I only thought there were only three or four makers of single slide projectors, 16mm movie projectors and slide projectors. I discovered hundreds of manufacturers that meet the needs of planetariums.

NAVA-81 taught me a new meaning to the adage: "To do a job right, you have to have the right tools." NAVA-81 was a showcase of the "right tools."

The highlight of this meeting was the unveiling of new computer control systems of projectors. The big five in multi-image programming and presentation--Arion Corporation, Audio-Visual Laboratories, Clearlight, Electrosonic Systems and Sprindler & Sauppe--took full advantage of control devices which are compatible with various microcomputer systems.

Arion came out with a host of new multi-image products. Heading the list were the computer-compatible Omni-Mate 2/C and 4/C dissolve units which can be programmed by Apples, PETs, Challengers and other general purpose computers and the Omni-Mate Memory Programmer, a 16-projector model with built-in dissolve ($2,495).

AVL unleashed another "animal" on the audio-visual market. Joining the Eagle, Cricket, Dove, Raven and Roadrunner in the firm's multi-image stable is the new Coyote. The unit has a memory programmer plus a three-projector dissolve in one

five-pound unit. Also on display was an expanded Roadrunner system which can accommodate 30 projectors.

Clearlight exhibited its Superior computer programmer ($4,495) with two disk drives, video monitor and Stargraphics imaging software. The firm also introduced the Star Universal Interface which controls up to five Star-2 or Star-3 dissolves and permits recording and playing back 50 cues per second. The system utilizes a Modified Apple II computer that can be expanded to control 135 projectors.

Computer compatibility was also found at Electrosonic Systems. The company featured the Sonic, a three-projector processor which can be controlled by a wide range of computer devices. To expand the functions of the system, Electrosonic is offering a multi-image production program for the Bell & Howell or the Apple II computer. This program is intended for presentations with up to 24 projectors and includes clock track synchronization, editing, filing, print out, status display, looping and automatic cue timing.

In addition to its top-of-the-line Director 24-Z multi-image programmer, Spindler & Sauppe premiered four new products at NAVA-81. The Director 12-Z is the newest Z-80 microprocessor-based console for programming and presenting as many as 12 projectors and 12 auxiliary devices.

More exciting than seeing and playing with these new control systems were seeing the A.V. shows.

One 21-projector show called "Powers of 2," I saw four times and each time it received a standing ovation. It started and ended with a NOVA explosion that exceeded any effect I have ever seen in any planetarium.

The day the first planetarian used a slide to augment his star lecture, was the day we became A.V. specialists. The 9, 15, 18 and 21 projector shows presented at NAVA-81 proved to me that every effect we labor so hard to achieve can be accomplished more cleanly and more reliably with slides, film and computer control.

The computer control systems I saw at this Dallas meeting were capable of controlling every single auxillary projector now used in planetariums. I was shocked to learn that such a control system could be installed at one-tenth to one-half the cost of currently available planetarium automation systems.

In short, I discovered that many planetariums exist in a technological "dark ages," and, if we are to survive, we must use new tools to excite the interest and imagination of our audiences. We owe it to our professional education and to our supporting institutions to attend a NAVA conference.

The 1982 National Audio-Visual Association Convention and Exhibit will be held at the Convention Center in Anheim, California, January 21-26, with exhibits open to the trade January 23-26. For information, contact: NAVA, 3150 Spring Street, Fairfax, VA 22031, (703) 273-7200.

HOW DO WE REMEMBER?

The following comes from the "Summer Solstice", 1981 edition of the S.W.A.P. newsletter.

"According to psychological studies, most of us remember approximately 1% through taste, 1 1/2% through touch, 3 1/2% through smell, 11% through hearing, and 83% through sight. (Source: Photomethods, February 1979, p. 59)" This is a useful piece of information which may help you in justifying additional funds for your educational and public programs.

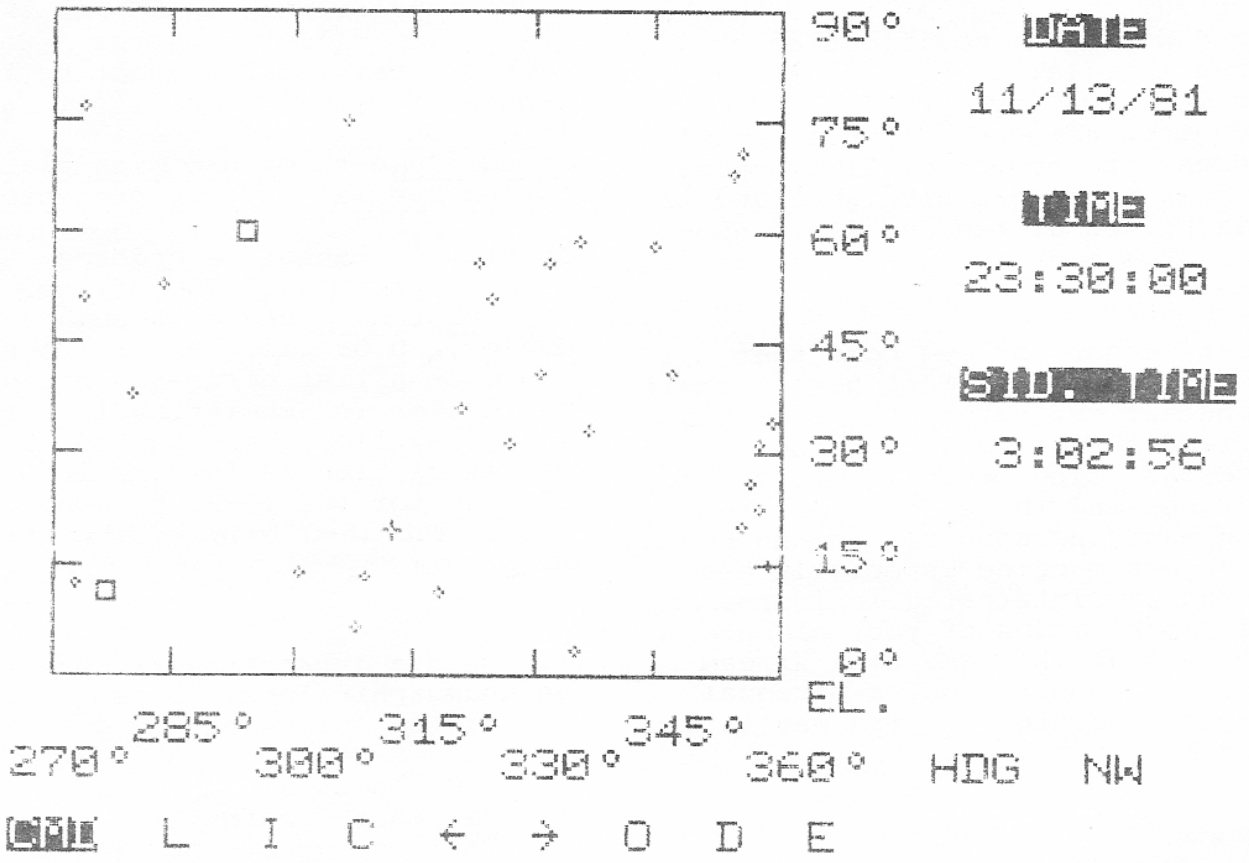
BYTING AN APPLE

By George Brown
Memphis Pink Palace Planetarium
Memphis, Tennessee

In the planetarium field, as in the rest of the world, we should be able to assume that there is a continuous increase in technology taking place. In recent years, we have seen the development of devices only dreamed of a decade ago. It is one of these devices, the personal computer, that is to have tremendous impact on the day to day operation of our facilities.

Small computers such as the Apple and Radio Shack machines are far more than elaborate video game centers; they are exceedingly powerful pieces of equipment capable of many complex astronomical calculations. In addition, the small computers may be used to keep track of your inventory, your budget, and your planetarium attendance, among other things.

While most planetariums are not directly involved in astronomical research, the astronomical calculation capabilities of the computer can be very valuable. With the Apple II Plus machine used at the Pink Palace Museum Planetarium, it is possible to determine sunrise and sunset times and points for any time of the year from any location on earth; the same determinations may be made for the moon, and it is possible to use the computer to calculate the proper annual and diurnal settings for your main star projector. Knowledge of computer programming and astronomical calculations is very helpful when working with one of these machines, but it is not vital, since several astronomical programs are commercially available. One of the best of these "packaged" programs is called Tell-Star Level 2. This program is available from Information Unlimited Software, Inc.--281 Arlington Avenue--Berkeley, CA 94707. Among the capabilities of Tell-Star are video presentations



An example of a high resolution star map produced with the Apple II computer.

of star maps as well as hard copy preparation, identification of unknown astronomical objects, rise and set times of various objects, and calculations of sidereal time. Generally this program costs about $50. In addition to commercially available programs, several very good astronomical computer routines are floating around the planetarium community, and they are available for the asking.

The personal computer also proves to be a powerful assistant in the administrative branch of the planetarium. At the facility in Memphis, our Apple II-Plus machine with 48k of memory is used to keep track of our entire budget for each fiscal year. The program we are using was not produced in-house, but was purchased from a local Computer Lab. The program we are using is the "General Ledger Accounting System For The Apple II Computer," and it is produced by BPI Systems, Inc. This program was written for a small business such as a grocery or drug store, but a little thinking and program modification produced an ideal piece of software for our facility. By putting our budget on computer, it has greatly reduced the amount of time needed to keep the books straight, and in this period of reduced staff numbers, the machine is paying for itself.

The time has not yet come that every planetarium must have a small computer, but surely the time has arrived that almost everyone can have one. The price levels of the machines and the ease of programming make the acquisition and use of such a machine especially easy. If you are interested in increasing the capabilities of your planetarium, and at the same time streamlining its operation, a personal computer should find its way into your budget plans.

ANAMORPHIC LENS

During the workshop conducted by John Hare at the SEPA meeting, a question came up concerning the acquisition of an anamorphic lens. This lens is especially good for rotating galaxy effects, etc. I remembered that we had recently purchased an anamorphic lens, so upon returning home I asked our Astronomer, David Duszynski, to give me the information concerning the purchase of such a lens. To my request I was told that D.O. Industries Inc., of East Rochester, New York, claims that there are now only two manufacturers of anamorphic lenses, both residing outside of the United States. According to D.O. Industries, the Kowa lens, made in Japan, is the best (D.O. happens to be the only American importer of the Kowa anamorphic lens).

Kowa has two versions of the anamorphic which differ only by the diameter of the rear barrel of the lens. The 16-D anamorphic has a 43mm diameter barrel and the 16-H has a 52mm diameter barrel. Each lens is designed for adapting to a 16mm movie projection system, and in almost all cases the 43mm back is sufficient for use with planetarium special effects projectors.

The lenses cannot be ordered directly from D.O. Industries, Inc.--they must be ordered through a dealer. D.O. will be glad to supply you with a list of nearby dealers. Our dealer is Schmitt Audio Visual in Louisville, which quoted the prices of $166.50 for the 16-D, and $247.50 for the 16-H, on June 23, 1981. The 16-D lens is also available from Sky-Skan for $165.50.

If you are interested in obtaining an anamorphic lens, please contact any of the following.

D.O. Industries
317 East Chestnut Street
East Rochester, NY 14445
(716) 385-4920

Schmitt Audio Visual
201 Breckinridge Lane
Louisville, KY 40207
(502) 893-7026

Sky-Skan Inc.
7350 Dryer Road
Victor, NY 14564
(716) 924-7355

Jack K. Fletcher

The planetarium featured in this issue of Southern Skies will be the site for SEPA's 1983 conference. After you read what Charlie has to say about this facility, I am sure you will agree with me that it is really going to be nice. Nobody has volunteered to write about their planetarium for the next issue so I wonder who I will ask. It may be You!

THE BEGINNING OF THE UNIVERSE

By Charles D. Smith
Science Museum of Virginia
Richmond, Virginia

Contrary to popular belief, the Universe began in October, 1980. If this seems like a strange statement, let me explain the "Universe" is the name which has been chosen for the planetarium/space theater at the Science Museum of Virginia, and the above-mentioned date was the groundbreaking for construction.

If I can go back in time to 1973, before the beginning of the Universe, the origins of our planetarium can be examined. The Museum Board of Trustees wanted to build a facility emphasizing the physical sciences, including a major planetarium. A large gift by one of the Board members gave impetus to the project, and with the opening of the Fleet Space Theater in San Diego, the direction became set. The Science Museum of Virginia would develop a large tilted dome planetarium utilizing the best available technology.

There were some setbacks related to funding and the Museum building itself, but in 1978 the General Assembly of Virginia appropriated funds for the project and the detailed planning began. Additional state funds became available in 1980. Using these funds, along with the first major gift and other non-state funds, we were able to contract for construction.

The building is a 32,000 sq. ft. addition to the existing 100,000 sq. ft. facility, the Broad Street Station. The design of the planetarium was carefully thought out to complement the 60 year old train station, a neo-classical structure with a large rotunda and exterior columns, designed by John Russell Pope. It features a 76 foot diameter dome tilted at a 27^{o} angle with seating for over 300. There is about 10,000 sq. ft. of exhibit area for astronomy and space science exhibits, office and support spaces for a staff of 10 or 11, and a large storage area.

The primary innovation of the Universe is that it will house the world's first computer graphics planetarium projector, the Digistar, presently being constructed in Salt Lake City by Evans & Sutherland. The decision to purchase

this system was made very carefully, after months of discussion and viewing demonstrations of the prototype in several locations. While there are uncertainties connected with any new and untried system, it seemed that the potential of this equipment was so great, and the demonstrations so convincing, that there was no serious doubt that we should have a Digistar. I have been traveling to Salt Lake City every two or three months to work with the engineers and designers at Evans & Sutherland, and each time I return to Richmond with an even stronger feeling that this is the planetarium system of the future. It is really quite exciting to be involved in the development of what I believe is the next generation of planetarium equipment.

The Digistar is really rather simple. It consists of a computer, some rather sophisticated software, and Evans & Sutherland Picture System 2, a very intense cathode ray tube, and a fisheye lens to project the images from the tube to the dome. Of course, there is a control console, projection housing, wiring, etc., but the system is small and compact compared to conventional equipment. The primary advantage of the Digistar is that images are created electronically and can be moved independently, rather than being fixed relative to each other as in a mechanical projector. Flying through space with stars changing relative positions and brightnesses is possible. Travel through time to see proper motions of stars is an exciting feature. Setting up planetary configurations for any date is done in a fraction of a second. Graphics can be projected on the dome using the Digistar. While there is room for improvement in brightness of images and adding color capability, I feel that the Digistar offers a new dimension to the planetarium community.

There are other features of the Universe I would like to discuss. We will have an Omnimax movie projector, capable of projecting high quality images over 2/3 of the dome. Similar systems in San Diego, St. Paul, and elsewhere have met with great success, with large attendance and revenue generation. There is a growing list of quality films available in the Omnimax format. Our expected pattern for public programs is to combine a roughly half-hour planetarium presentation with a half-hour Omnimax film.

We are in the process of finalizing the design of the sound and multimedia systems. We have the capability of using about 225 slide and special effects projectors controlled by an automation system. A 35 speaker sound system is being designed which will allow speaker access through joy stick control. By the end of the year these plans should be complete.

As I look out my window at the building site, I see the steel framework up, the walls nearly completed, a lot of the roof decking in place, concrete floors which cover thousands of feet of conduit and wiring, and I can almost imagine the visitors arriving in the spring of 1983 for the first program. They are an eager group of people, having long awaited this day. They don't quite know what to expect from a place so bold as to call itself the "Universe", but their expectations are high. They file into the chamber, the lights go down, and they embark on a new adventure - a journey through the Universe.

SOUND EFFECTS

During the past SEPA meeting I heard many people talking about the "BBC Sound Effects Library." People were asking such questions as what is it, where does it come from, and, more importantly, how much does it cost? After returning home and conducting a little research, I was able to come up with answers to these

questions.

The "BBC Sound Effects Library," which includes 35, 12" stereo LP's, contains over 2,000 different sound effects. The effects range in length from a few seconds to a few minutes. The variety of sounds range from airplanes to machines to weather. Accompanying the library is a 120-page handbook which gives suggestions on each of the effects and a cross-reference guide to all sound effects included in the library. The "BBC Sound Effects Library" costs $350 and there is "no needle-drop charge" for using sound effects.

I also found out that there is a "Theme Music Library" available. This library includes 25, 12" stereo LP's and contains over 1,000 musical themes. Theme music from television shows and movies to Americana to classical to jazz are included. The "Theme Music Library" costs $350 and there is "no needle-drop charge for non-commercial or in-house use" and there is "instant telephone clearance for commercial use."

If you are interested in obtaining more information on the "BBC Sound Effects Library" or the "Theme Music Library" write to Audio Archives, Films for the Humanities, P.O. Box 2053, Princeton, NJ, 08540. Their toll free telephone number is 800-257-5126.

Jack K. Fletcher

THE CARE AND USE OF MAGNETIC RECORDING TAPE PART IV: THE MYSTERIOUS 60 CYCLE HUM

By Michael F. Ryan
Earth-Space Science
Center Planetarium
Howey In the Hills, Florida

OK, gang, on the count of three I want everyone to generate a low, bass humming sound from your throat. [This may present somewhat of a problem for you dear ladies but give it your best.] Ready? One. Two. Three. Hmmmmmmmmmmmmmmmmmmmmmmmmmmmm.

Well now, did that sound familiar? Did it faintly resemble the low pitched sound which is continuously coming out of your theater speakers? If so, congratulations and welcome to the world of 60 cycle hum.

I fully realize that this subject is not exclusively tied to tape decks, but rather is a general bug which can enter anywhere along the line of audio gear. Since, however, it is so common a problem it is worth giving it our consideration.

First of all, what causes 60 cycle hum? (Or 60 hz hum for you young purists.) The most frequent culprit is the AC power cord. There are other, more exotic sources which we shall discuss later, but first the common power cord.

I hate to keep sounding like an old physics teacher (gulp, which I am) but to solve the problem we need to understand the basics. Let us try to picture, as best we can, what is happening in the copper wire of your power cord beneath all that protective insulation.

We in North America use 117v., 60 cycle per second, alternating current to run most of our appliances. Just one cycle of this type of electricity could be described as follows: All the free electrons in the outer shells of the wire's copper atoms are first induced by the power company (which in my state we call Florida Flicker and Flash) to run in one direction along the length of the wire. Suddenly the electrons stop only to find themselves induced to run the opposite direction. This forward, stop, backwards, stop motion of electrons is what we call one complete cycle of alternating current flow. And this happens 60 times each second.

In addition to this hectic back and forth motion there is a side effect.

Whenever electrons move they generate an invisible magnetic field in the space around them. In the case of electrons running inside a straight wire, the generated magnetic field is circular in shape. To better understand this consider the following:

Suppose you tied a piece of string in a knot around one spot on a power cord and asked yourself what the field would look like at just that one cross section. Let us invent an analogy. Take a horizontal pencil (imagined to be the wire) and slip a phonograph record onto the pencil (the record likened to the magnetic field). The grooves in the LP would then represent circular magnetic lines of force in the space around the wire.

As long as electricity flows in the wire, these 'grooves' stay put. But as soon as the current stops, something strange happens. The magnetic field collapses in toward the center. The 'grooves' all shrink towards the wire. And when a moment later the current starts up again, the 'grooves' reverse and expand themselves outward.

However, since there are an infinite number of cross sectional spots along the power cord, the mental picture of the field should be changed. On your horizontal pencil imagine a whole stack of LP's all packed against each other. Thus the circular magnetic field surrounding a current-carrying wire looks more like a cylinder than a flat disc. Since we are talking about alternating, stopping and starting current, this cylindrical magnetic field constantly expands and then collapses about the wire.

Just as electricity can create magnetism, the reverse of that statement is also true. A moving magnetic field can induce electricity to flow elsewhere. Imagine, if you will, another wire or cable placed next to and parallel to your power cord. As the cylinder of magnetism expands and collapses, the 'grooves' or magnetic lines of force cut across this second cable and will induce an alternating current to flow in that cable.

If that second wire happens to be an audio cable, say, running from your tape deck to the amplifier, this 60 hz alternating current will be introduced to the amplifier, amplified and ultimately fed to the speakers. The result is a 60 cycle tone, similar to the low bass note everyone hummed a few minutes ago.

Sometime ago, I had the opportunity of visiting a multi-million dollar star theater. The director was beside himself. Despite his exotic sound equipment, the caliber of which would make most of us drool, he was ready to dump it all because of the bass hum. I happened to look down behind the counter on which was standing various tape decks, mixing boards, etc. There I saw all neatly bundled in nice parallel rows all manner of power cords and audio patching cables.

So, you ask, how does one get rid of the hum, especially since wherever there are audio cables there are bound to be power cords? If you can arrange the audio cables so that they are positioned perpendicular (90°) to the power cords, you can prevent the induction from happening. If this is not possible and both sets of wires must run parallel to each other, separate them as far apart from each other as space will allow. Also, be aware of the fact that 60 cycle hum can enter your system even through speaker wires placed near power lines.

Unfortunately, there are other culprits which can cause the same effect. Many dimmers are notoriously noisy as well as (and this surprised me) even some computer dissolve units. When you think of a planetarium console which may have ALL of the above gear concentrated in one area with perhaps only one raceway for all cords (audio and power) the problem compounds itself.

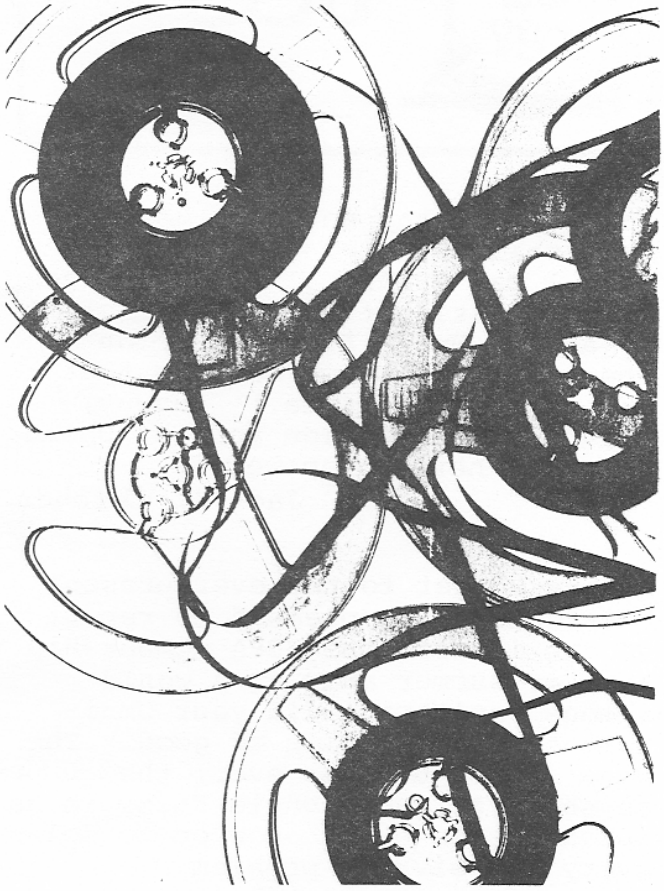
Now for something rather weird. In the fall of 1980, I had set up for a recording session with the person who for five years has been the voice of Astro Bird in my elementary school shows. While checking out the equipment, I noticed a distinct buzz in the earphones. Not a 60 cycle hum, mind you, a higher pitched buzz. I checked cable placement. I turned off the amplifier, the computer dissolve units, even power to the theater. The buzz remained constant as ever. As a last resort, I switched off the overhead fluorescent lights. The buzzing stopped.

An audio expert explained to me later that what had probably happened was this: Fluorescent lights which flicker on and off at the rate of 120 times a second are actually generating an arc inside the bulb with each flash. This arc creates a radio wave which is capable of traveling several feet around the structure. The radio wave, in turn induced a 120 hz tone in the cable leading from the microphone to the mixer. This, he explained, is a problem with high impedence microphones and their cables, as such, should be kept as short as possible. (The recording session, incidently, was conducted using incandescent bulbs.)

So much for the weird, now for something sad. These elementary school programs which feature Astro Bird and a small boy by the name of Billy are designed to be a dialogue interchange between the two. Since it is impossible to get the two persons together for a single recording session, each voice is separately recorded, with the final voice track being a series of splices. (If you have never done this, let me clue you in....it's a real pain.) Billy's recording session took place in my home. In my anxiety about coaching the boy to have the right voice inflections, I apparently paid little attention to cable placement. You guessed it. There is a distinct 60 cycle hum behind everything he says. I didn't catch it during the recording session because the dumb earphones I use have a very narrow frequency response leaving little to be heard at the low end. Unfortunately, I used the same headset while splicing the voice tracks together, being completely unaware of the problem until I was ready for the final mix to blend in music and sound effects.

You can imagine how disgusted I was with myself. There was no turning back. Too much work had been put into the production and the show's beginning was just around the corner. The tape, as is, had to be used. Fortunately, the theater amplifier has a five channel graphic equilizer built into the unit and I was able to selectively lower by -12 db a band width which centered on 40 hz. The hum was diminished to almost inaudible levels.

I guess there is a lesson to be learned here. Despite how knowledgeable we may be, we are all capable of the same stupid mistakes. Rasenfratzen mumble bleep.



CORRECTION IPS 1982 CORRECTION

Bill Peters informed me the dates for the 1982 IPS meeting would be June 26 - June 30, as I reported last issue. Bill now tells me those were the dates he was given but he now understands those dates were wrong. The correct dates for the 1982 IPS meeting will be July 26 - July 30.

Uncle Fuzzy has not been getting much mail - - - at least the type that I can print. I therefore ask SEPA's president to set an example by asking Uncle Fuzzy a serious question. (I'm not so sure that was such a good idea.) Anyway, here is the question and our Uncle Fuzzy is here to answer it.

Jack K. Fletcher

Before we get to the ever-present questions, I am pleased to report to the illustrious SEPA membership that my summer stay at a world famous sanitarium did your Omniscient Wonder worlds of good. The mind is as quick as ever; the tongue as sharp as ever; Uncle Fuzzy is as obnoxious as ever. Now on to solve every conceivable problem.

Dear Uncle Fuzzy:

I have this problem which is driving me to distraction. In our theater, we have two different computer dissolves as well as several manual dimmers to control projectors. Somehow over the summer a demonic rafter elf entered the theater, set up residence and is now generating a moderately loud buzz into our sound system. The noise is especially loud during a fade up or fade down of manual or programmed projectors. I have checked all the wiring and nowhere is there an audio patch cable or speaker wire near the projector cables. The audience is apparently unaware of the buzzing, but I can hear it and it is personally quite distracting. Can you offer any advice?

Mike Ryan
SEPA President

Dear Pres:

(Good Gravy! - a letter from the president! Am I honored or what!) My first impression was that you might be experiencing noise from your computer dissolves. These devices use an electronic gismo called a triac to control bulb brilliance. Triacs are notoriously noisy devils and can introduce spikes (a buzz) back into the AC power line. It is possible that such spikes could then be fed into your audio amplifier through the amp's power cord. If the filler in the amp's power supply section is not top notch, the buzz from the spikes would be amplified and transmitted to your speakers.

One way to reduce such spikes is to have power to the sound system come from a circuit different than the circuit power to your dissolves. (Theoretically, the spikes would have a farther distance to travel, with the effect somewhat lessened.)

As I said, that was my first impression. Then I noticed that your letter indicated that manual dimmers were causing the same problem.

My best guess is that you probably have a ground loop problem with your sound system. How do you get rid of it?

Take a look at the back of your tape deck, mixer panel, amplifier, etc. Most of the better equipment will have a connection terminal called a chasis ground. Try connecting a wire from each unit to set up a common ground among all elements in the audio system. I'll lay odds that your problem will disappear.

(Incidentally, Mr. President, there is no way to keep a secret from the SEPA family. My informed sources in Florida have told me that you were recently married--September 30th is the reported date--to a science teacher in your school system. Does the name Susan do anything for you? My congratulations and best wishes for the future. Uncle Fuzzy knows everything.)

Uncle Fuzzy

Dear Uncle Fuzzy:

Recently I had a group of up-tight Black students in the planetarium who told me that they were sick and tired of all the Honky constellations like Cassiopeia and Andromeda. They wanted to know where the Black constellations were. Well, where are they?

Up Against The Wall

Dear Up Against The Wall:

Check your mythology, Brother. Cassiopeia was the queen of a country known as Ethiopia. Now what continent do you suppose Ethiopia is in? Australia? If that does not satisfy your students, pick out some obscure group of stars and call it the constellation Leroy. (We will go to any lengths to be inoffensive to all denominations.)

Uncle Fuzzy

Dear Uncle Fuzzy:

Our on-campus observatory has a 16 in. Cassegrain telescope which is so mounted that anything lower than 15° above the horizon is out of view. This includes heavenly bodies in the nearby women's dormitory. Can anything be done to permit us larger than life images?

Hung Up

Dear Hung Up:

(You people must think that I have a one track mind! How about some questions dealing with religion or politics?) One of two solutions should be obvious. Either add windows to the observatory or watch re-runs of Charlies' Angels on projection TV.

Uncle Fuzzy

A MESSAGE FROM YOUR SECRETARY/TREASURER

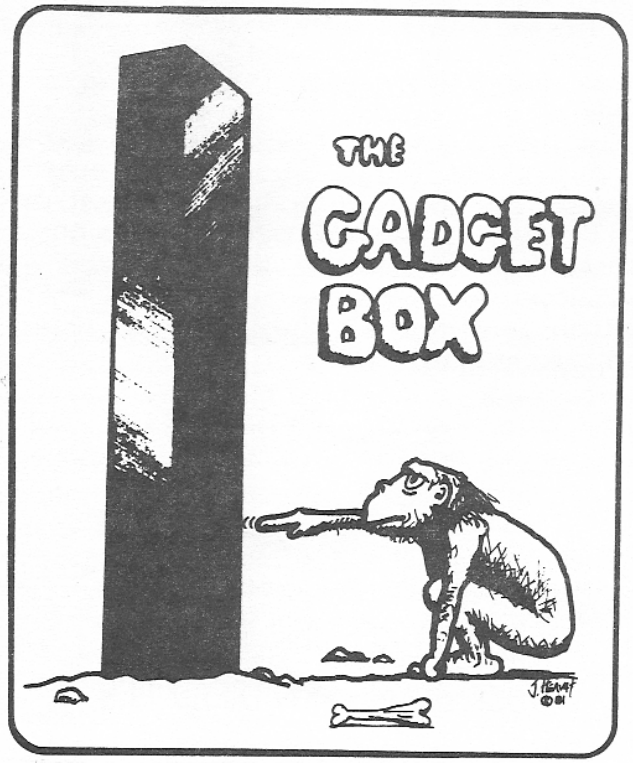
By Richard Joyce
Hampton Planetarium
Hampton, Virginia

With the main thrust of the membership drive over now, our numbers stand close to the 100 mark which is about thirty short of last year. The checks keep coming in one at a time so I hope ranks will approach their former level.

The treasury appears to be minimally sufficient to see us through the current membership year. The current balance of $727.64 must print and mail several editions of the newsletter and provide seed money for the next conference. We won't make it through with much of a surplus but we will make it through.

As luck would have it many of you sent your dues in just after the

last newsletter was in the mail. Jack Fletcher and I sent out the overprinting copies on a first come, first serve basis. Nearly everyone was accommodated though their issues were several weeks later than the others. We will continue this practice in the future if overprinting copies exist.



In the Gadget Box for this issue, John Hare is discussing how to make one of those really neat and low priced special effects he is so well-known for. John is starting by telling us how to make the general enclosure and projector. In the following issues of Southern Skies, John will be telling us how to build special effects to fit in the projector. This information should be of great value to us all.

METEOR DOWNPOURS: This year's Leonid Meteor Shower peaks on November 17 and will yield about 10-15 meteors per hour. Every 33 years the Leonid shower is spectacular providing hundreds of thousands of naked eye meteors per hour. The next Leonid downpour is expected in 1999.

A MODULAR APPROACH TO SPECIAL EFFECTS PROJECTORS

By John Hare
Bishop Planetarium
Bradenton, Florida

If your planetarium is like most everyone elses, you probably cannot afford to purchase all of the special effects you would like. If you construct your own effects, there is usually a limit to the number of projectors available for modification. In our productions at the Bishop Planetarium, a given Starshow can employ up to perhaps 3 dozen special effects. Over the course of a year, in excess of 100 different effects are used. Since many of our effects share certain common elements (light source, condensing system, projection lens, etc.) we decided to design a basic projector housing that would accommodate interchangeable modules or devices.

This article will discuss the projector and housing design. Future articles will contain specific module designs for effects such as:

Rotating Planet (Equatorial View)
Rotating Slide
Rainbow
Solar & Lunar Eclipse
Revealer
Cepheid Variable Star
Eclipse Shadow
Stellar Evolution
Single Slide
Black Hole
Radiating Body

Basic Projector

In selecting a projector to incorporate in the housing, our primary criteria were cost and suitability. We chose a 35 mm filmstrip projector which, while limited to a focal plane area slightly larger than 35 mm halfframe (filmstrip format), proved by far to be the cheapest. The projector (no brand name) is available from Herbach & Rademan for

$22.50, or from C & H Sales Co. for $24.95.

The projector comes with (about) a 1 1/2" FL lens. A directly interchangeable 3" FL, f 3.0 lens is available from Edmund Scientific for $12.50 (#30959) page 13, Fall 1981 Catalog.

If you have a substantial quantity of a different projector available, adjust the housing dimensions accordingly to accommodate it.

Enclosure

Construct the enclosure according to the plans. Paint the interior flat black. Attach the module channels before installing the projector.

Projector Modification:

The following procedures apply to the above projector.

1. Strip all removable components from the projector.

2. Drill out the pop rivets and remove the front leg.

3. To accommodate the modules, it is essential that there be unobstructed access to the focal plane. This is accomplished by cutting the projector in half immediately in front of the condensing system. (4" from the rear of the projector) - We used a band saw with a metal cutting blade.

4. Using a 1/8" bit, drill out the threaded mounting holes for the lamp socket.

5. Using a #28 bit, drill a hole 1/4" outboard on either side of the lamp socket mounting holes. These holes will be referred to as projector mounting holes.

6. Drill and tap front portion as indicated in drawing. This will allow you to lock the 1 1/2" FL lens in place when focusing on images near the rear plane of the effects module. To allow the 1 1/2" FL lens to slide far enough into the opening for focusing, you must remove the knurling from the front of the lens. We did this by "turning" it in a lathe. (A file and a vise would work equally well, but would require considerably more time.)

7. Cut the removed rear leg 1/8" above the botton bend (you will now have two 90° angle pieces). Drill as indicated on projector drawing. These pieces should be attached to the front portion of the projector, utilizing the holes from the removed shaft, with a 6 - 32 x 3/8 machine screw. (Use flat washers to allow the nut to seat properly over the hole.)

8. File an opening on the left side of the projector for the lamp wiring. (See projector drawing.)

9. Using 1/8" diameter x 1/2" pop rivets, attach the lamp socket to the projector body as follows. If you are going to use the original CAR lamp (150 watts), attach the socket to the TOP of the mounting tabs. If you wish to employ a brighter lamp (for a large dome or an extra bright effect) attach the socket to the BOTTOM of the mounting tabs. The lower socket mounting will provide the proper filament location for a CAL lamp (300 watts).

10. Solder an 8" piece of #18 zip cord to the terminals of the lamp socket.

11. Reattach the mounting bracket for the front condensing lens.

12. Mount the rear projector body in the enclosure as follows. Position the body in the enclosure so that the projector

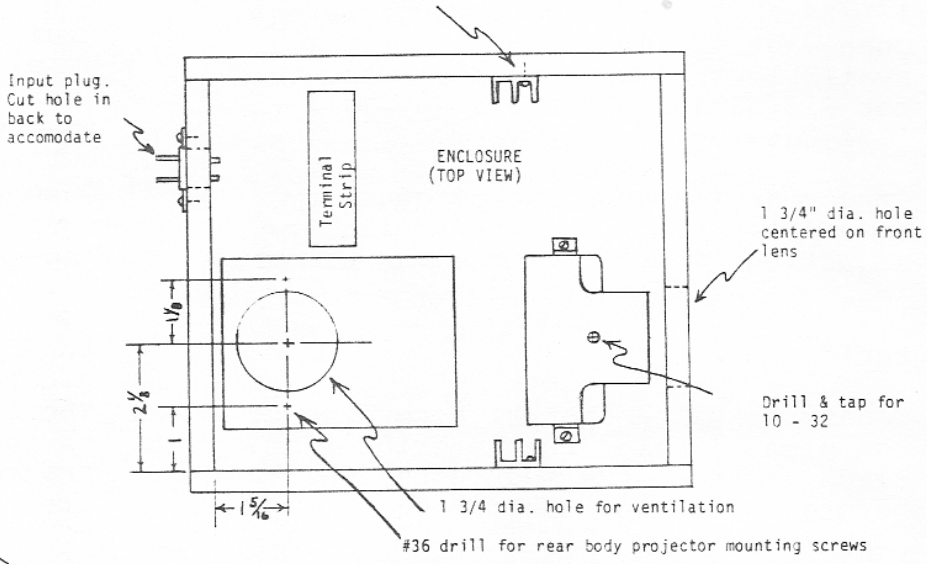
CONSTRUCTION NOTES
Use 3/8" plywood except bottom which is 3/4" plywood.

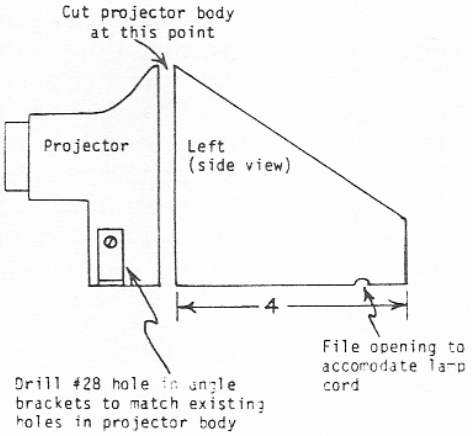
Dimensions:
- Front & Back - 7 x 6 1/4
- Sides - 8 3/4 x 6 1/4
- Bottom - 8 x 7
- Top - 7 3/4 x 8 3/4

Glue & nail front, back, sides & bottom.

Be sure to attach module channel before installing projector.

MODULE CHANNEL -
Use aluminum window channel with 1/4" wide channels (buy at storm window dealer)
Attach with #6 x 3/8" sheet metal or wood screws





PARTS LIST

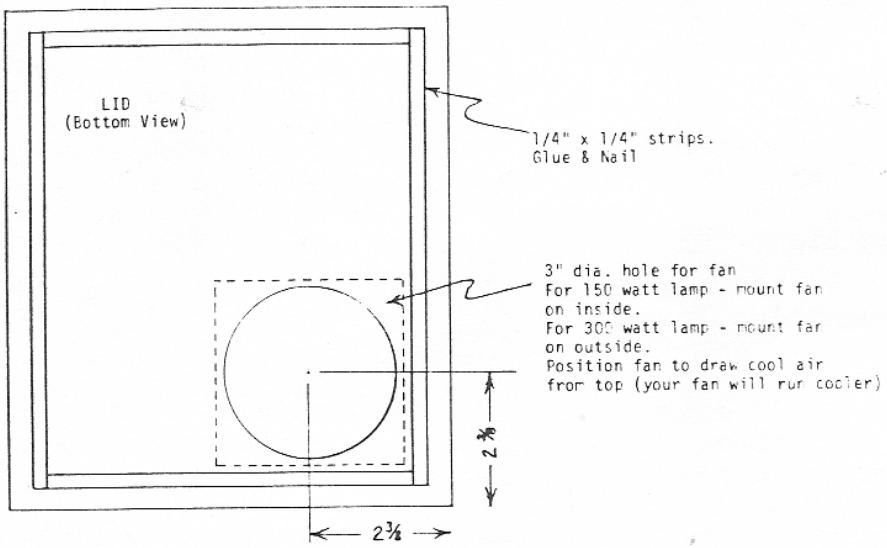
Projector(Herbach & Rademan, #TM21K819 or C & H #OL8007)
Fan, Rotron Sprite (C & H #ACB 7904, $9.95)
Terminal Strip, TRW Cinch 5-140
Input plug (projector housing) TRW Cinch P-306 AB
Input socket (from your control) TRW Cinch S-306 CCT

SUPPLIERS

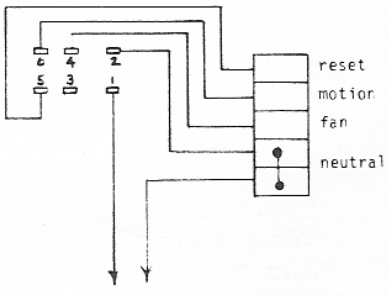
C & H Sales Co.
2176 E. Colorado Blvd.
Pasadena, CA 91107
(213-681-4925)

Herbach & Rademan
401 E. Erie Avenue
Philadelphia, PA 19134
(215-426-1708)

Edmund Scientific
101 E. Gloucester Pike
Barrington, N.J. 08007
(800-228-2606)



WIRING DIAGRAM



DESIGN AND ALL DRAWINGS BY
JOHN HARE

mounting holes line up with the #36 holes on either side of the bottom vent. Take the removed lamp shield and place over the lamp socket so that the mounting holes line up with projector mounting holes. Be sure to orient the shield with the opening facing forward. Attach to enclosure with #6 x 1 1/4" sheet metal or wood screws.

13. Place both condensing lenses in their respective brackets and cement in place using GE silicone rubber caulk (or equivalent).

14. Mount the front projector body in the enclosure using #6 x 1/2" sheet metal or wood screws.

15. Depending on where you use the projector, you may find it necessary to place a baffle over the top vent hole. We use black construction paper and staple it to the lid with the opening facing the rear.

DR. STRANGE'S SEPA CIRCUITS CLINIC, etc.

This is a new column in which Joe Hopkins will be giving us schematics on how to build some really useful circuits. Just follow Joe's drawing and you should have no trouble. If you have a question, give Joe a call or write him a letter and he will be glad to help you.