

# SOUTHERN SKIES



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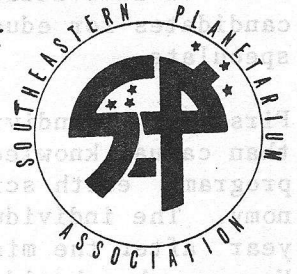
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Your cooperation will insure the continued timeliness of Southern Skies.

Southern Skies would like to express appreciation to Ruth S. Freitag at the Library of Congress, Washington, D.C., for allowing us to reproduce the bibliography of resources on Comet Halley. It is reprinted from the Summer 1983 issue of The Quarterly Journal of the Library of Congress.

Contributing artists: Jim Summers, Atlanta, Georgia, p. 8.

# Southern skies



Volume IV, Number 4

November, 1984

## A Message from Your President

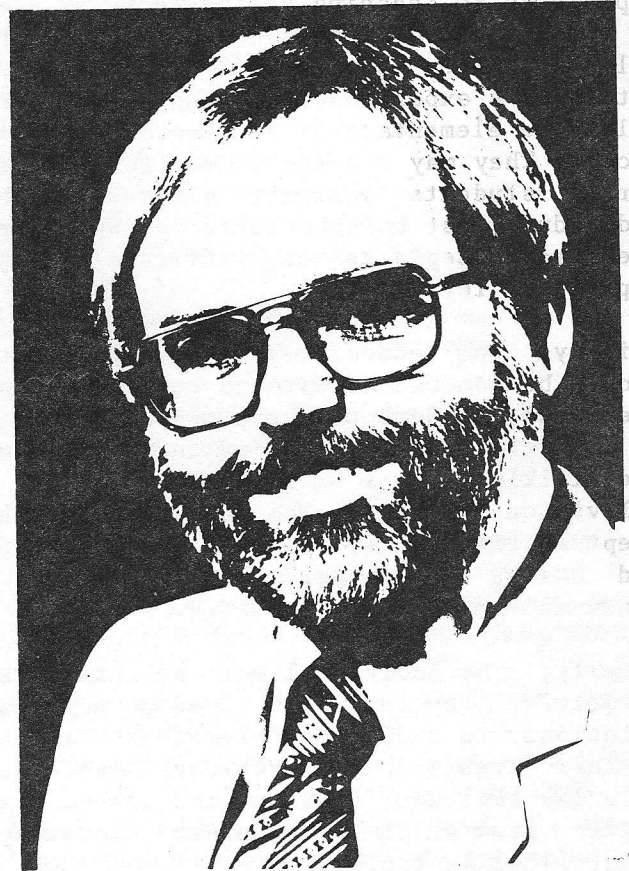
by Duncan Teague

It was a hot August afternoon. I was working late in my office when the telephone rang. No one should have expected an answer at this number so late in the day except my wife.

A little-old-lady voice began talking as soon as I answered "Craigmont Planetarium." She declared, "I nominate you to be the first teacher to go to the Moon!" My first thought was that I was on Candid Telephone, but ten years of practice at patiently handling off-the-wall questions stood me in good stead. Confidently I answered, "Hunh?"

I eventually recognized the voice as belonging to the Social Activities Director of a local senior citizen's club. She and her group are regular and continuing patrons of my facility. I stumbled through the rest of the conversation with some not so eloquent disclaimers about how I was content to let others do the work and just report the results. I would be too scared to "go to the Moon" but greatly admired the spirit and courage of those who did. I was as kind and gracious as I could be considering my thoughts about the present condition of the caller. I had no idea she was sober and serious.

When I got home, Judy explained President Reagan's announcement of the intention to send an educator on a future mission of the Space Shuttle. My caller's understanding of the project as sending a teacher to the



"Moon" was simply a layperson's interpretation of any trip into space. Now I was excited!

At the time of this writing NASA has yet to specify in any detail the qualifications of the educator-astronaut candidates. The only stipulation so far is that applicants must be elementary or secondary classroom teachers. I hope that doesn't leave me out of the running. I work in a secondary school, serve both elementary and secondary students, and my "classroom" just happens to be an astronomy laboratory.

I have no knowledge of what characteristics NASA or individual states will look for in candidates for educator-astronaut, but I'll speculate.

First, the individual should have a more than casual knowledge of the American space program, earth science, physics and astronomy. The individual selected will spend a year after the mission on a lecture tour. He or she should be able to explain the purpose and characteristics of the mission and its context within the larger Space Shuttle Program.

Secondly, the candidate should have some experience in teaching a wide range of ages in his or her classroom. The people who will assemble to hear of the educator-astronaut's experiences will not be limited solely to elementary or to secondary audiences. They may run the gamut from kindergarten students to senior citizens. The individual must be accustomed to explaining the same concepts to many different age and experience levels.

Thirdly, the educator-astronaut candidate should be someone accustomed to addressing the media. Some teachers may be dynamite in the classroom but out of their element when talking into a microphone or facing a television camera. The candidate must be adept at fielding questions from the media and having the answers be concise, make sense and be interesting.

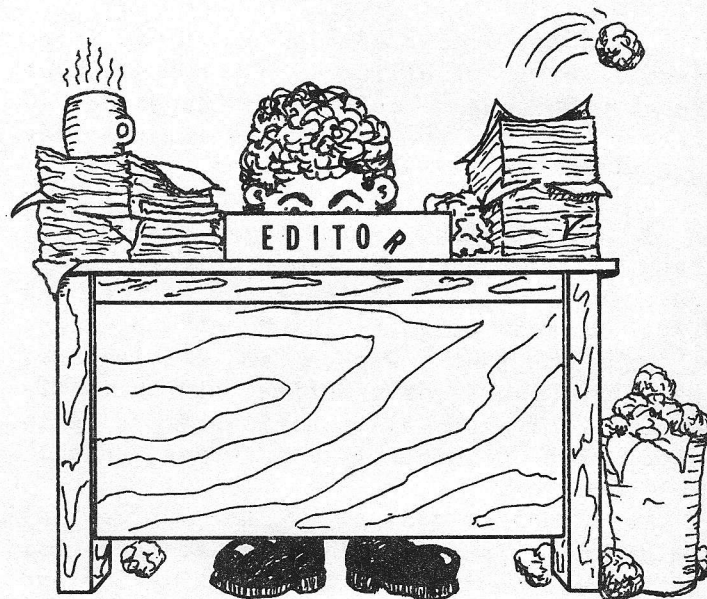
Finally, the individual must be creative. Creativity is needed to develop workable solutions to sudden problems; to relate unusual events to the everyday experiences of a lay audience; and to find new vantage points from which to generate excitement about familiar topics.

You, gentle reader, may be the very person best qualified for the educator-astronaut program. Planetarians, on a daily basis, display all of the aforementioned characteristics. We recite the most exotic concepts in astrophysics to first graders in terms they can understand. We make quick substitutions for projectors that fail five minutes before the high school Mythology class walks into the theater. We spend five minutes before a television camera explaining safe techniques for observing a solar eclipse.

If there is an individual better qualified to be the Space Shuttle Educator-Astronaut than any member of the Southeastern Planetarium Association, I hope he or she will visit my planetarium after the mission.

On a different subject, this is my last "message" as President of this organization. I owe many thanks to the officers and committee members who preceded me, who served with me, and who will follow. Thanks go, in no particular order, to Mike Ryan, Richard Joyce, Jack Fletcher, Tom Hocking, John Hare, Kathy Summers, Jim Summers, Don Walter, Jon Bell, Sue Griswold, Rita Fairman, Charlie Smith and to Southern Skies contributors too numerous to mention. These individuals have made the last two years a pleasure and not a burden. I've loved every minute of it.

Okay, John, it's your turn now.



by Tom Hocking

During the interval between the last issue of Southern Skies and this, an item has surfaced which I feel is important enough to warrant space here, since it concerns Southern Skies itself.

As many of you might already know, when Dr. Jack Fletcher was the Editor of Southern Skies, the Journal was printed using the printing services of Eastern Kentucky University. Since EKU's printing service was greatly discounted, it hasn't been until this present volume that SEPA has been paying the real cost of producing the Journal.

An average twelve-page issue of Southern Skies costs approximately \$200.00 per issue to print and mail. The last two issues though, haven't been typical, as you recall. Also, postage will be going up shortly. As a result, we need to face an important financial fact. In order to continue producing the Journal that SEPA members demand, we are going to have to consider the possibility of raising dues. The alternative is to restrict the amount of editorial material in each issue to live within current resources.

Essentially, there are two main expense items in SEPA's budget: Conferences and Southern Skies. For the current year, we face no financial crisis, but I did have to limit pagination in this issue so that SEPA had enough seed money to give to the planners of next year's SEPA Conference at Golden Pond, Kentucky. So, SEPA member, please consider what you want of your Journal before we meet next June, and whether you will be willing to pay for it.

## A Special Committee on Astronomy Education

by Bill Luzader  
Brockton Planetarium  
Brockton, Massachusetts

Planetarium directors are science educators no matter the size of their dome. Because of their environment, planetarium directors are more specifically astronomy educators. If planetarium directors wish to keep up with research in astronomy education, they must refer to many different journals such as Planetarian, Sky and Telescope, Mercury, American Journal of Physics, The Science Teacher, and many different organizations such as IPS, NSTA, ASP, AAE and AAPT.

In an attempt to centralize this information, the American Association of Physics Teachers (AAPT) has organized a committee on astronomy education. Some of the charges given the committee include organizing paper sessions on astronomy and astronomy education at physics teacher meetings, coordinating joint programs with other societies concerned with astronomy education and encouraging astronomy courses in high schools.

An accomplishment of the committee is the establishment of a column on astronomy education in The Physics Teacher magazine. The column will consist of one article of 750 words with one illustration or 1,000 words without illustration. If you are interested in submitting such an article to the magazine, send it to: Robert Dukes, Department of Physics, University of Charleston, Charleston, South Carolina 29401. Dr Dukes is the chairman of the Astronomy Education Committee of the AAPT.

Another charge of the committee is to study the possibility of publishing a journal dedicated to Astronomy Education. The journal will tentatively include articles concerning research in astronomy education; laboratory and demonstration experiences in teaching astronomy; reviews of books, films and computer materials for astronomy education; and reports on astronomical research. Micheal Zeilick of the University of New Mexico researched the need for this type of journal. The conclusion of his research was that enough articles are published every year to support such a journal and that the journal should be international in content and distribution.

Dr. Zeilick has also prepared a survey for an Astronomy Education journal. It is included in this publication. If you wish to make your feelings known about such a journal, fill out and send the completed questionnaire to: Bill Luzader, Brockton Planetarium, Brockton High School, 470 Forest Avenue, Brockton, Massachusetts 02401.

If you have previously completed this survey from another journal, please disregard this copy. If you have any suggestions as to how this committee can serve the planetarium community, please feel free to include your ideas with the survey.

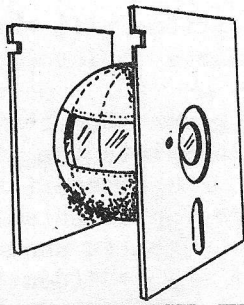
The committee includes Dr. Dukes; Dr. Zeilick; Mr. Luzader; Henry Shipman, Dept. of Physics and Astronomy, University of Delaware; Ronald Schorn, Editor, Sky and Telescope; Andrew Franknoi, The Astronomical Society of the Pacific, San Francisco; and Jay M. Pasachoff, Hopkins Observatory, Williams College. This committee has been formed to aid with communications among astronomy educators. Planetarium directors are astronomy educators. Write a column for The Physics Teacher and send it to Bob Dukes. Send ideas, suggestions and the completed survey to Bill Luzader.

1. What is your opinion of the need for an astronomy education journal?  
 (a) highly needed (b) needed (c) somewhat needed (d) not needed (e) no opinion
2. How often do you think such a journal should come out to be useful?  
 (a) Biannual (b) Quarterly (c) Every other month (d) Monthly (e) no opinion
3. If such a journal existed, would YOU subscribe to it PERSONALLY?  
 (a) Yes (b) No (c) Maybe
4. If such a journal existed, would you recommend your department to subscribe?  
 (a) Yes (b) No (c) Maybe
5. If such a journal existed, would you recommend your LIBRARY to subscribe?  
 (a) Yes (b) No (c) Maybe
6. If the journal were offered at a REDUCED RATE for people who are members of the sponsoring organization, would that influence your decision to subscribe?  
 (a) Very strongly (b) Strongly (c) Somewhat (d) Not at all

Below are possible features of this journal. How would you rate your interest in each?

Very Interested	Interested	Neutral	Not Interested
(a)	(b)	(c)	(d)

7. Feature articles on recent astronomy research
8. Research articles on Science education
9. Book reviews with follow ups
10. Computer software reviews with follow ups
11. Movie/video/slide reviews with follow ups
12. Teaching ideas with class-room applications
13. Do you see yourself professionally as (a) primarily a researcher, (b) primarily a teacher, (c) balanced with teaching/research activities?
14. Would write articles for this journal?  
 (a) Yes (b) No (c) Maybe
15. If you answered "Yes" to the above question, how many articles in a year?  
 (a) 1 (b) 2 (c) 3 (d) 4 or more



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

Halley's Comet on your Home Computer  
Reviewed by Duncan Teague

I'll bet you've been using your computer with only the monitor showing you what's happening inside its tiny silicon brain. The printer has been turned off since the last time you spent a weekend catching up on your correspondence, hasn't it? I'll bet you have a box of printer paper just sitting around gathering cobwebs. Want to use up some of that paper--fast? Then get yourself a copy of Eric Burgess' "Halley's Comet on your Home Computer," tell that old Apple to "PR#1," and watch the paper fly!

You don't really need a printer if you have a photographic memory, because you can view all the program output on your monitor. A title screen appears shortly after the program is booted and offers you an explanation of what the program does. "HC on your HC" provides the user with physical data on Comet Halley, its orbital elements, the history of its passages through the inner solar system, and when and where to find the comet. The main menu offers seven options.

1. Comet Halley in History
2. Comet Halley Information
3. Apparitions of the Comet
4. Comet and Earth Orbit Plots
5. Comet Halley Finder
6. Worldwide Skyplot
7. End

Option one recounts some of the highlights of the last 27 apparitions of the comet. The information includes when the comet was lightly regarded and why; when serious study began; superstitions associated with and literary references to comets in general; the date of Halley's closest approach, highest magnitude, and greatest angular diameter; current space missions (by other countries); and the goals and headquarters of the International Halley Watch. The comet is presented in appropriate context with reference to current and future study.

The second option provides orbital element data in tabular form of the next and previous three passages of the comet through the inner solar system. Next a high resolution graphic diagram of the comet's perihelion trajectory for 1986 is plotted, but hard copy is not possible without a screen dump utility. Option three is a concise listing of the dates of the aforementioned apparitions with brief notes on reported observations. Options four through six are the meat of the program.

Option four shows an animated high res plot of the comet's perihelion passage of 1986 with the Earth, Venus, Mars, the Sun and the direction of the vernal equinox displayed on any of three user-selected scales. Option five "finds" Halley's Comet, selects an appropriate "star map," and shows the comet's position with respect to the Moon, the planets, and (optional and time consuming plots of) constellations in that region of the sky. Option six allows the user to select a specific time,, time zone, location and area of the sky to determine whether the comet is visible. The chosen portion of the celestial sphere is displayed and the appropriate objects plotted in a horizon referenced view. With each of the three latter options, a legend is printed below the display. This legend identifies the scale of the display and any other pertinent data.

The price of \$49.95 for these six programs seems a little steep, especially since the 29 programs on two "Celestial Basic" diskettes sell for the same price. But, remember, Halley's Comet (on your Home Computer) is a once in a lifetime experience!

S & T Software Service  
13361 Frati Lane  
Sebastopol, California 95472  
Apple II and Apple compatibles

TellStar: Your Computer Graphics Window  
to the Universe  
Reviewed by Duncan Teague

Astronomical computer software falls into five basic (no pun intended) groups. There are instructional programs which demonstrate specific astronomy or physics concepts. There are utility programs which provide quick calculations or conversions of information found in The Astronomical Almanac. Some programs work like an orrery, locating objects on a chart of the solar system. Others simulate a planetarium, providing an Earth-referenced view of the sky. Finally, there are ambitious programs which attempt some combination of the above functions.

TellStar is the slickest planetarium simulator I've seen. I make such a bold statement because TellStar allows the kind of control of the viewing circumstances that a planetarium provides. The planetarium can change the direction of view with the azimuth control. Diurnal and annual motion and latitude movement can alter the time and location of observation. Auxiliary projectors can be used to outline constellations. The console operator can point out individual objects in the sky for identification. Imagine having all these functions combined with quick recall of ephemeris information and astronomical conversions, and you have an idea of what TellStar provides.

The IBM version requires DOS 2.0 or later to operate. When the program is booted, the current Viewing Location parameters are displayed. The original "standard" of Boulder, Colorado is easily changed with one of the Program Options. A "New Standard" entered at this time is saved onto the program disk and becomes the new "Standard" Viewing Option. A "Random" location may also be chosen to see what the sky looks like from other parts of the world without changing the "Standard" parameters.

Next the Viewing Time and Date information is entered. A data table summarizes the entries and provides some additional information: day of the year, Julian date, mean time, sidereal time and Universal Time. It also contains a menu of six choices.

- |               |                  |
|---------------|------------------|
| 1 - Display   | 4 - New Location |
| 2 - Utilities | 5 - End Program  |
| 3 - New Time  | 6 - Print Screen |

The first two options will be discussed since the others have obvious functions.

The Display mode gives the user the eleven commands which simulate the motions and capabilities of a planetarium director. "L(ocate)" allows you to enter an object's name and have the computer show you its location on the screen. "I(dentify)" tells the name and any pertinent data on an object you select with movable crosshairs. The crosshairs are moved horizontally, vertically or diagonally one (or 15, in the "express" mode) pixel(s) at a time with eight logically chosen keys. The "C(onstellation)" command draws outlines of the major constellations.

The entire display can be changed using the numeric keypad. Left and right arrow keys move the view 45 degrees at a time in their respective directions. The up arrow key changes to an overhead view, minimizing the distortion introduced by the rectangular format of the monitor. The down arrow key takes you back to the horizon view. You can choose the view from a cardinal or intercardinal "D(irection)" with the "D" key. The "P" and "S" keys respectively "P(rint)" a hard copy of the screen and "S(ave)" the view to disk. The "E" key will "E(nd)" the Display mode.

The Utilities mode makes conversions. Altazimuth coordinates can be changed to equatorial and vice-versa. Heliocentric coordinates can be converted to geocentric. Precession adjustments update star table coordinates based on Epoch 1950. Finally, solar system objects can be selected for display alone. This saves time normally taken to load information from the program's stored star position data.

The program comes in more than one version. Level One has one star table for the Northern Hemisphere and a limited number of constellations. Level Two contains three star tables covering both hemispheres and all Messier objects. Solar system, stellar and Messier objects are represented by screen symbols. Only the IBM Graphics Printer can print out a hard copy of the graphics portions of the screen. All printers can reproduce the text. Both color (composite and RGB) and monochrome monitors can be used. The soft cover operations manual contains nine appendices with location information for stars, Messier objects and major world-wide cities.



This is one instance in which the printed brochure describing TellStar doesn't do justice to the program. TellStar is great!

Scharf Software Systems, Inc.  
Suite 1068, 2111-M 30th St.  
Boulder, CO 80301  
Apple II/II+/IIe; \$39.95 and \$79.95  
IBM PC/PC Jr./XT; \$49.95, \$99.95, \$129.95

Astro 64  
Reviewed by Duncan Teague

Astro 64 is a utility program providing ephemeris information on solar system objects. It performs its computations in a fraction of the time it takes to locate and make hand calculations based on Astro-nomical Almanac data.

Upon loading from cassette (six minutes) or disk (one minute), the program requests the usual information about the location of the observer: latitude and longitude (in the form of degrees-decimal-minutes, south and east prefixed by a minus sign), (numerical) time zone and longitude of its central meridian, year, month, day, local time (in the form hours-decimal-minutes) and whether Daylight Savings Time is in effect.

The Data Display Menu offers the following:

1. Sun, Moon and Planets
2. Sun and Earth
3. Moon
4. All Planets
5. Mercury
6. Venus
7. Mars
8. Jupiter
9. Saturn
10. Uranus
11. Neptune
12. Pluto
13. Star-Finder

The last option merely converts equatorial coordinates to horizon coordinates. The first option sequentially displays all the information available separately with options two through twelve.

The "Sun" screen provides practically every piece of useful Sun data a planetarian would want to know. It gives the Sun's rise and set times including all three definitions of twilight; the correction factor for mean solar time versus local time; local sidereal time; the Sun's

angular diameter and distance from Earth; its position in equatorial and horizon coordinates; and the ecliptic longitude of both Sun and Earth.

The "Moon" screen is equally practical. The position of the Moon is given in ecliptic, geocentric and topocentric coordinates. Its apparent size, distance from the Earth, elongation from the Sun, % illuminated and rise and set times are given.

Each individual planet is covered in the same detail. In addition to the usual position, distance, configuration and appearance data, the planet's magnitude is also given.

At the end of all the calculations is the "Additional Data Options" menu.

1. Return to (Main) Menu
2. Another Time of Day
3. Another Day and Time
4. Another Month, Day and Time
5. Another Year, Month, Day and Time
6. Run Program from Start

Astro 64's data option menu thus takes some of the tedium out of selecting other observation circumstances. Other programs reviewed usually require the re-entry of most or all of the time information even when only small changes are required.

The time taken to complete calculations from one screen to the next is about five seconds. "Data statements" hold the numerical values for the orbital elements. This information can therefore be updated from one year to the next if you recognize which number is what quantity. The disk I reviewed provided output only to the monitor screen. Mr. Ciavola writes that the program has been revised to support the use of a printer.

The price of Astro 64 puts it in the same range as other astronomical utility programs for the Apple, IBM and Timex Sinclair computers. I would like to see Mr. Ciavola develop an astronomy education program which takes advantage of the color and sound capabilities of the Commodore 64. He certainly has a good grasp of both programming and astronomy fundamentals.

Michael J. Ciavola  
120 Connie Park Drive  
McKees Rocks, Pennsylvania 15136  
Commodore 64, \$19.95

Thanks Mr. Newton  
Reviewed by Duncan Teague

"THANKS MR. NEWTON" is a welcome relief from education programs aimed at primary grade levels. Instead, it's a high school level physical science and physics tutor. It teaches classical Newtonian mechanics as illustrated by free fall and by projectile motion within a gravitational field.

The program loads in 6:15, and the title screen is followed by a menu with six choices.

1. Introduction
2. Terms
3. Formulas
4. Free Fall
5. Projectiles
6. Firing Range

Notice that there is no unnecessary option to "end" the program? Thanks TAG Software!

The "Introduction" suggests the implications Sir Isaac's historical discoveries have for modern applications. One screen shows an "apple" falling from a tree; the other, a satellite in orbit around the Earth. The next two menu options define the "Terms" and give (but do not derive) the "Formulas" which describe the relationships between those terms. A little trigonometry is thrown in for good measure. This should require a little extra research on the part of users whose physics and mathematics background doesn't include these concepts.

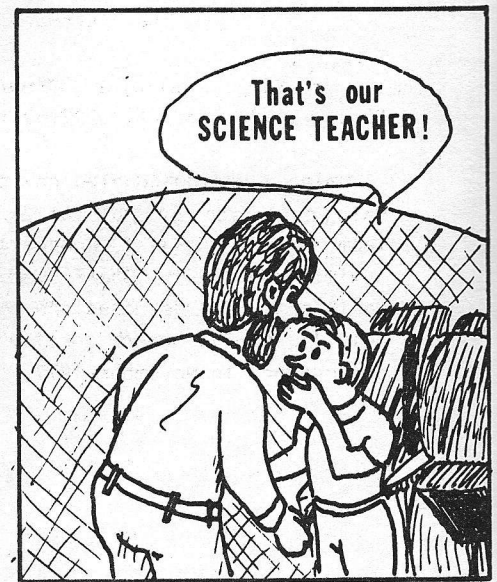
Menu options four through six are interactive rather than tutorial. "Free Fall" is a simple laboratory experience. The user can "drop" an object from different altitudes and watch it accelerate. The velocity is calculated at half-second intervals and the impact velocity is shown. "Projectiles" expands on the previous laboratory experience and adds an initial horizontal velocity to the falling object. Equal time interval plots show parabolic paths of a "bomb" dropped from an "aircraft" and a "shell" shot from a "cannon."

The final selection, "Firing Range," is a game which rewards for mastery of the preliminary material and reinforces the concepts already taught. The user can now manipulate more than one variable. It is possible to use either a rigorous approach or trial-and-error to ascertain the effects of varying both the initial velocity and the firing angle of a projectile.

The program is written entirely in BASIC as are all the products of TAG software. It is extremely well documented. Three and one-half pages of printed notes explain the structure of the program and the programming techniques. One page is used to provide an overview of the program's purpose and operation of the individual routines. The program serves as a model of how the computer should be used in education.

TAG Software  
Box 688  
Naugatuck, Connecticut 06770  
16K Timex Sinclair 1000 & 1500/  
16K Sinclair ZX81; \$13.95

## FUZZFACE



# Future Music Library

by Robert Tate  
Harper Planetarium  
Atlanta, Georgia

Ask me to write a script. Ask me to run a program. Ask me to invent a new special effect projector and build it. You can even ask me to get some art work done. Ask me to do most anything that's needed in a planetarium and I can do it. Maybe not as well as someone else, but well enough to get by in a one-man planetarium. But please, don't ask me to select music for a planetarium production.

I know what I like in planetarium music, but given a whole record store full of potential music, I doubt if I could find the right music to exactly fit my shows. I'm rarely happy with anything which comes on records. To make matters worse, my head isn't swimming with music, so I'll never be able to compose my own. Music just isn't my gift.

Last winter I received a call from John Serrie, who has become one of the leading music composers specializing in planetarium music. John spends most of his time producing custom soundtracks and music for some of the larger planetariums, but he called to find out if there was a need in the planetarium for more stock music in a format similar to that produced by Loch Ness Productions. I assured John that planetariums would beat a path to his door as soon as he could get a tape library into production. I also told him what I think are the requirements for planetarium music.

This fall I was pleased to receive the first John Serrie Future Music Library tape to be produced. I have been like a kid with a new toy ever since. The Future Music Library meets all my expectations in planetarium music as follows.

1. The music is melodic. John Serrie's music sounds like music, not like a collection of electronic sounds. Musical themes are carried out nicely with treatments which are not monotonous. While produced electronically, the voices of traditional flutes, horns and strings are identifiable in many places.

This makes the music quite friendly rather than alien. One needs only to listen to the public radio series on electronic music called Hearts of Space to see that all electronic music is not musical.

2. The music must help create the mood needed during each segment of the program. The Future Music Library does this nicely, containing selections designed to fit a variety of needs from anticipation to fulfillment. Appropriate themes are present for back grounds to the most-often needed segments of a program, such as walk-in, introduction, historical, etc.

3. The music must not have a strong beat and must have little syncopation. In my planetarium, with my heavily ethnic audience, highly syncopated selections, even played at very low levels, brings out the rhythm in kids who want to stomp and clap to the music. Few selections in the Future Music Library will suffer such abuse!

4. My music must have a controlled dynamic range. Music which is designed to be heard usually has such a range of volume that it is impossible to use as background music. That's why the 1812 Overture is not appropriate as planetarium music, even at low volume. John's music is designed to be felt more than heard. It's there, and you can feel it, you can listen to it too, if you want, but it never gets in the way of the spoken word during sections of the program where information is being transferred to the listener. This more than anything makes it so valuable to the production.

5. Even though I am in a school planetarium with little chance of being caught were I to use ASCAP licensed music, I feel that an artist is due consideration for his creation. For this reason my productions now use only music which I have purchased the right to use. The Future Music Library comes with permission for use in in-house productions.

6. Finally, the quality of the tape must be as high as possible. With the inevitable degrading which always occurs in mixing the final program tape, it is necessary that the original be as clean

and pure as possible. John is meticulous in this respect, using high quality tape recorded with the utmost in care.

John Serrie at last is making his talent available to all of us. I don't know how he plans to make a living charging as little as he does for the music he is offering. But I'm going to buy up everything he puts out, for one day soon some film producer is going to "discover" this creative gem and snatch him away from our grasp. When that happens, I want my audiences of school students to be able to hear John Serrie where he belongs, under the dome.

I understand that John will soon make available other selections in addition to the Future Music Library which is now ready for purchase. I eagerly await their release.

## SEPA Rumor Mill

by A.N. Onymous

Usually when the residents of Georgia and the inhabitants of Florida congregate on opposite sides of a football stadium, there is great disagreement and a divergence of opinion on the part of all concerned. With this in mind, the SEPA Rumor Mill (SEPARM) was greatly surprised the other day when it learned of a coalition being formed by two individuals, one from each of the aforementioned states, with the expressed purpose of producing complete planetarium shows aimed primarily at those theaters specializing in school programming.

SEPARM has learned that this new organization is going by the name of SUMMER NIGHTS. Who are the two individuals involved with this venture? Well, if the name of the production firm doesn't give you a hint, we might mention that one of the persons, a former president of SEPA, works at a rather prestigious installation in Atlanta where the name Zeiss is frequently heard--hardly a Mickey Mouse operation. The other individual, also a SEPA past president, calls Central Florida his home, and has previously concealed himself under the pseudonym of Uncle Fuzzy, but of late can be found at home limping around with an ankle-biting, little rug rat clutching at his leg.

All who know the reputation that these two planetarians have forged for themselves, realize that some rather unique products are in the offing at prices 90% of all school planetariums can afford. To give you a taste of their product, SUMMER NIGHTS will shortly be providing a 20 slide set of pin-registered visuals depicting the orbital paths of the earth and Halley's Comet for 19 dates in 1985-86, and all for the unbelievable sum of \$25.00. Keep your eyes peeled for a flier which should reach you soon.

## Conference Planners Promise "Second Coming"

by Doug Gegen  
Golden Pond Multimedia Theater  
Golden Pond, Kentucky

In the 1700s, Dan'al Boone prowled the wooded forests and mountainy mountains of Kentucky looking for something. Some feel that he went in search of freedom and a place to build a home. Some feel that he sought a Walmart selling 60-watt light bulbs. But few know the truth. Daniel Boone was looking for the moon. Boone has graciously agreed to return to Kentucky with the story of his search at the 1985 SEPA conference in Land Between the Lakes. His talk is entitled, "Dan'al Boone finds the Moon," which hints at the outcome of his search.

Make your plans to hear him during the 1985 Southeastern Planetarium Association Conference June 10, 11, 12, 1985 at the Golden Pond Multimedia Theater, Land Between the Lakes in the hills of West Kentucky.

## Star chores

by Patty Ryan  
Tampa Tribune - Tuesday June 26, 1984

The kids who never wanted down-to-earth jobs grew up to be stargazers, reasoning, as their T-shirts proclaim, "Who else can promise you the sun, the moon and the stars--and deliver?"

BRADENTON - We knew them when thick, black eyeglasses, slide rules and pocket pen holders were as basic to their wardrobes as underwear to ours. When we asked for bicycles, they asked for telescopes.

They knew the answers in science class; even worse, they knew they knew.

They surfaced here for a conference last week, still knowing the answers, still looking upward while the rest of us fumbled through the first six feet of the earth's atmosphere, our eyes glued forward in tiny, tiny universes as they looked to matters of a larger sky.

And those smart-alecky looks were still on their faces.

"Hey, did you hear they opened up a new restaurant on the moon?" Luther Bradfute from Memphis' Pink Palace Museum Planetarium asked his dinner partners Thursday night. "Yeah, the foods great, but there's no atmosphere."

Yuk, yuk.

'Twas the Southeastern Planetarium Association's annual conference, held this year at the Bishop Planetarium on the banks of the Manatee River. More than 100 astronomers and planetarium directors from throughout the Southeast--and from as far as India--gathered for five days of workshops, symposiums, speeches and general brainstorming on the state of the nation's planetariums.

Their workshops had names like "Dr. Strange's SEPA Circuits Clinic," "Return to the Planet of the Ektagraphics: Care and Feeding of the Ektagraphic Slide Projector" and "Put a Byte in Your Dome: Microcomputers in the Planetarium."

"Each time they come, they learn something different," said Susan Ryan, a sixth-grade science and math teacher from Eustis who met her husband, Mike Ryan, while he was giving star shows in the Ocala National Forest.

Mike Ryan directs a school system planetarium. Once public school system planetariums like his were more secure than privately funded planetariums like Bishop, he said in an interview. (Private planetariums live off admission fees, so if people don't come, planetariums don't make money.)

But times are changing. "School systems are looking around to see what frills they can get rid of," he said. Some consider planetariums "frills," not a popular viewpoint at the conference.

Meanwhile, private planetariums are finding ways to guarantee audiences.

When John Hare IV took over the South Florida Museum and Planetarium less than five years ago, it had a five-figure deficit, he said. Now it's in the black. Hare and his staff make money for the museum by bringing in hundreds of paying customers for weekend laser light shows. For many planetariums, that's the only way to survive.

During these shows, audience members lie back in the planetarium's cushioned chairs, their eyes focused on the huge dome above them. The room lights go off. In minutes the planetarium is flooded with bursts of light and music.

Thursday, in one of two special shows put on for the delegates, laser lights--alternating between bright and dim, in varying colors--danced to the music of Journey.

A laser light show is a roller coaster of relentless sensation, a superspeed spirograph with the brain for a drawing board.

It was chewing gum for the eyes, one observer noted.

Earlier that evening, the stargazers had listened to Von Del Chamberlain, director of the Hansen Planetarium in Salt Lake City, Utah, and former director of the Air and Space Museum's planetarium in Washington, D.C. He was preparing them for the 1986 coming of Halley's comet.

Chamberlain's speech was entitled "Through the Eyes of the Comet."

He gave a sense of immortality to a comet that, while not immortal, has far outlived those on the planet who study it. When the comet swept past Earth in 256 B.C., Archimedes, who built the world's first known planetarium, was living, Chamberlain said. In 12 B.C., it was seen over Rome and years later was interpreted as the Star of Bethlehem, he said. When it appeared in 1531 A.D., Columbus had visited America.

Each time it comes, the Earth has changed, although through the comet's "eyes" the planet that watches it has always been cloaked in nighttime darkness, Chamberlain said.

The 1986 visit by the comet will mark the first time that the Earth's nighttime sky has been illuminated by electricity, he noted, and the first time that the comet will be greeted in space by "robot messengers" (satellites) from Earth.

Earth's future could be told in terms of what the comet will "see" when it comes again in 2016, he said, asking, "Where will the dark places (on the planet) be?"

The large dose of seriousness was followed by the laser light show, and then cocktails in the museum courtyard.

But even as they socialized, the astronomers talked about equipment. They listened to an electronic music concert (many planetariums use electronic music in their programs) and watched more laser images on a courtyard wall.

Some, like Dick Paterson of Kentucky, had come a long way for the conference. Paterson, whose planetarium will be host of the conference next year, drove 100 miles just to get a flight into Tampa, then drove with a friend to Bradenton.

They left Friday and Saturday with images of the planet Earth stamped across their chests on T-shirts, T-shirts like those already at home, the ones that say, "Date an astronomer. Who else can promise you the sun, the moon and the stars--and deliver?"

And, "My mother and father went to Alpha Centauri and all they brought me back was this crummy T-shirt."

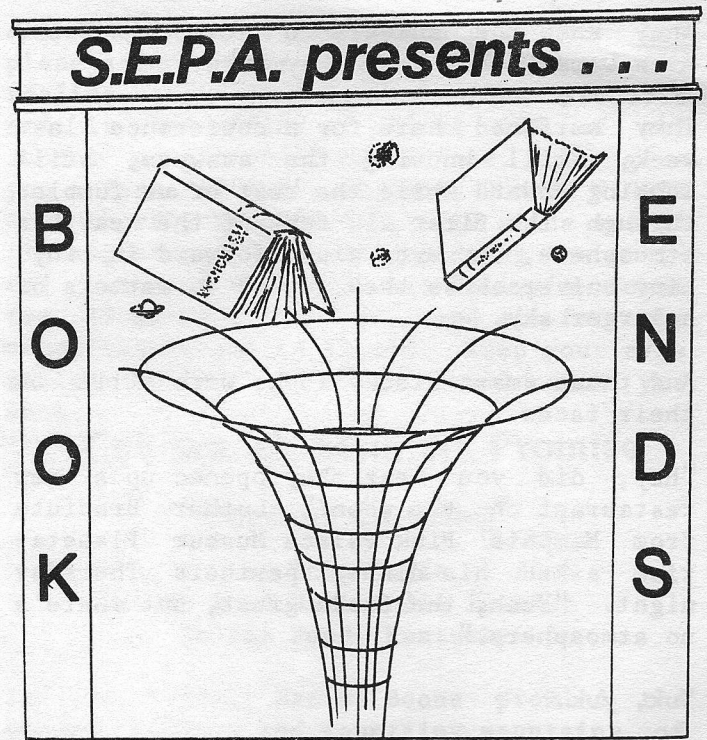
As the conference wound down, some of that high-school spirit came back. Speakers took turns throwing whipped-cream pies at each other.

Some things never change.

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If anyone taped Von Del's talk at the 1984 SEPA Conference in Bradenton, Florida, please get in touch with John Hare. His address appears in the front of this issue.

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Countdown

Reviewed by Tom Hocking

Published monthly by Main Stage Publications, Inc. ISSN 0746-8830

Price: \$15 per year (US), \$20 foreign, \$25 via Air Mail

Address: P.O. Box 216

Athens, OH 45701-0216

With the advent of routine access to space as a result of the Space Shuttle, the major media has severely cut its coverage of the US manned space effort, as if "routine" access to space equates with "boring" access to space.

To fill this gap in coverage and serve the legions of space aficionados, several small, low-budget, independent enterprises have begun publication. This review looks at one such specialized magazine.

Countdown is a young magazine (first published July, 1983) which deals exclusively with the missions of the Space Transportation System. It also seems to be gaining popularity rather fast. As of March of this year, paid circulation had already passed the 2,000 mark.

A typical issue runs between 12 and 16 pages long, and is packed with the essentials: a drawing of the mission patch, short biographical sketches of the crew, in-depth articles describing the upcoming flight (or the one just finished), and lots of behind-the-scenes material as well.

Countdown is the brainchild of Dixon P. Otto, who serves as editor and publisher of the periodical. Among its many strengths, is the more-than-casual descriptions of the scientific experiments and mission goals to be accomplished and the neat follow-up stories after the Orbiter has returned to Earth. Countdown accepts advertising, but it doesn't make any editorial sacrifices in doing so.

The only weakness of this handy periodical is the fact that, for the present, all of the pictures and other illustrative material are in black and white. Perhaps, as its popularity grows, this minor (in light of everything else the magazine delivers) detail will be rectified. Nonetheless, in the absence of being able to get on NASA's press mailing list directly, this \$15 investment is worth every penny as an item that every serious planetarian's library ought to possess.

# Halley's Comet Bibliography

A Selected List of References

Compiled by

Ruth S. Freitag

Science and Technology Division

Library of Congress

The following list of references was winnowed from a comprehensive bibliography currently in preparation, and is intended to guide reference librarians, readers and observers to useful materials published during this century, nearly all of them in English.

## The Discovery

Comet trekking: Halley's heavenly body returns. *Time*, v. 120, Nov. 1, 1982:69.illus.

AP2.T37, v. 120

Using a charge-coupled device with the 200-inch Hale reflector on Palomar Mountain, "a Caltech team led by British Graduate Student David C. Jewitt, 24, and Staff Astronomer G. Edward Danielson, 43," detected the comet on the night of Oct. 15/16. The search for the comet began at this observatory in November 1977.

Di Cicco, Dennis. Comet Halley found. *Sky & telescope*, v. 64, Dec. 1982:551.illus.,col.port.

QB1.S536, v. 64

More details of the recovery of the object now designated 1982i. The portrait is of Danielson and Jewitt.

Halley's Comet returns. *New Scientist*, v. 96, Oct. 28, 1982:215.

Q1.N52, v. 96

Acknowledges the contribution of the astronomer who calculated the ephemeris used in the search (Donald K. Yeomans of the Jet Propulsion Laboratory in Pasadena).

Halley's Comet swings into view. *Discover*, v. 3, Dec. 1982:16.illus.

Q1.D57, v. 3

Hughes, David W. The recovery of Halley's Comet. *Nature*, v. 300, Nov. 25, 1982:318.

Q1.N2, v. 300

Notes that the recovery was confirmed by Belton and Butcher at Kitt Peak on the nights of Oct. 18 and 20, and comments on both the accuracy of Yeomans' ephemeris and the skill of the Palomar team.

The author's letter correcting a statement made in the article appears under the heading "Cometary Record" in the issue of Dec. 16, p. 572.

Wilford, John N. Halley's Comet appears, a billion miles away. *New York Times*, v. 132, Oct. 21, 1982:1.illus.

N&CPR

## The Search

Dunkle, Terry. To catch a comet. *Science* 82, v. 3, Oct. 1982:44-52. col.illus.

Q1.S354, v. 3

"Illustrations by Greg Hargreaves/Hellman Design."

Describes the activities of three astronomers who spent four nights in February 1982 at the 107-inch telescope of McDonald Observatory in an unsuccessful attempt to pick up Halley's Comet.

Halley's Comet--out of sight, but not beyond study. *New Scientist*, v. 95, July 29, 1982:300.illus.

Q1.N52, v. 95

On a study by Michael Belton and Harvey Butcher, published in *Nature*, v. 298, July 15, 1982, p. 249-251 (Q1.N2, v. 298), deducing the size, surface albedo, and mass of the comet's nucleus from their failure to detect it during their most recent search. The two astronomers predicted that the comet might be found by late September or early October 1982.

Waldrop, Morris Mitchell. In quest of Comet Halley. *Science*, v. 216, May 7, 1982:606.illus.

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Newburn, Ray L., and Donald K. Yeomans. Halley's Comet. In Annual review of earth and planetary sciences. v. 10;1982. Palo Alto, Calif., Annual Reviews. p. 297-326  
QE1.A674, v. 10

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Contents: Introduction.--Periodic Comet Halley moves through history.--Comet Halley's motion and nongravitational forces.--Meteor showers associated with P/Halley.--Physical properties of P/Halley.--The coming apparition of Comet Halley.

### Recent Publications of General Interest

Anderson, Norman D., and Walter R. Brown. Halley's Comet. Illustrated with photos and prints. New York, Dodd, Mead[1981]78 p.illus.,ports.

QB723.H2A56

For young readers.

Asimov, Isaac. The long ellipse. Magazine of fantasy and science fiction, v. 62, Jan. 1982:137-147.

AP2.M2344, v. 62

Chiefly about Halley's Comet. See also his "Change of Time and States" In the April issue, p. 133-143.

Belton, Michael J.S. The hairy stars. In Science year; the World book science annual 1983. Chicago, World Book[1982]p.1581-69.illus.(part col.)

Q9. See 1983

"Astronomers anticipating the return of Halley's Comet are mounting a worldwide effort to learn more of the secrets of this special family of celestial objects." Much of the article deals with the search for, and plans to observe, Halley's Comet during its forthcoming return.

Branley, Franklyn M. Halley: comet 1986. Diagrams by Sally J. Bensusen. New York, Lodestar Books, E.P. Dutton[1983] 83 p.illus. QB723.H2B73 1983

For young readers.

Bibliography: p. 75-76.

Calder, Nigel. The comet is coming! The feverish legacy of Mr. Halley. New York, Viking Press[1981] 160p.illus.,facsim.,col.plates,ports.

QB721.C34

Bibliography: p. 152-156

Published in paperback by Penguin Books in 1982.

Attempting a light-hearted approach, the author has achieved only a relentless flippancy that will turn off some readers. The illustrations are beautiful; however, the one on p. 20 purporting to show Toscanelli's plot of the comet in 1456 is actually his record of the comet of 1449/50.

Halley's Comet Watch newsletter. v. 1 + May/June 1982 + Vincentown, N.J. 2 no. a year.

"Official publication of Halley's Comet Watch '86," described as "an international organization dedicated to the historical, scientific and sociological study of the 1985-86 return of Halley's Comet." Membership/subscription fee is \$3 a year. Write to Box 188, Vincentown, N.J. 08088. (Fee increased to \$4 for 1984. Back issues available.)

Hendrie, Michael J. The return of Halley's Comet. Spaceflight, v. 24, June 1982:242-248:illus.,port.

TL787.B725, v. 24

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Hughes, David W. Here comes Halley's Comet! Sciences, v. 18, Feb. 1978:6-9,31.illus.,port.

Q1.S8147, v. 18

"Suggestions for a space mission to chase the hairy wanderer." The cover of the issue reproduces in color the Bayeux Tapestry representation of the comet's 1066 appearance.

Kronk, Gary, Mr. Halley's hairy star. Astronomy, v. 9, Sept. 1981:16-22.illus.(part col.),port.

QB1.A7988, v. 9

Gives considerable attention to the history of orbit calculations for the comet, searches of European and Chinese annals for records of its earlier appearances, the comet's physical characteristics, and the meteor streams associated with it. The cover of the issue reproduces a color photograph of Comet West (1976).

McDonnell, James A.M. The ESA Giotto Comet Halley Mission. In Yearbook of astronomy. Edited by Patrick Moore. 1983. New York, W.W. Norton[1983] p. 165-198.illus. QB1.Y4, 1983

Bibliography: p. 197-198.

Includes information on the Soviet and Japanese missions.

McLaughlin, William I. The natural history of Halley's Comet. In British Interplanetary Society. Journal; space chronicle, v. 34, July 1981:266-280.illus.,port. TL790.A1B7, v. 34

References(51):p.279-280.

Reviews some characteristics of comets in general--their origin, orbital evaluation and constitution. Then, focusing on Comet Halley, three episodes in dynamics are discussed: the original work of Edmond Halley, the use of the comet as a gravitational probe in the search for a trans-Plutonian planet and the combination of modern methods with ancient observations in the determination of the comet's orbit. The 1986 apparition is previewed by considering a few of the plans to launch space probes and what should be the objectives of in situ



exploration. The physical and cultural views from Earth complete the work." The cover of the issue reproduces a 1910 photograph of the comet.

An illustrated adaptation of some of this material appears under the title "Halley's Comet--Messenger From Space" in Spaceflight, v. 23, Aug./Sept. 1981, p. 212-213 (TL787,B725, v. 23), with a correction, headed "Erratum," in the October 1981 issue, p. 256.

Maran, Stephen P. Getting ready for Halley. Natural history, v. 90, Nov. 1981:32, 34-39.illus.

QH1.N13, v. 90

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Marsden, Brian G. Comet Halley and history. In Symposium on Space Missions to Comets, Goddard Space Flight Center, 1977. Space missions to comets. Editors: M. Neugebauer, D.K. Yeomans, J.C. Brandt, R.W. Hobbs.[Washington, D.C.] National Aeronautics and Space Administration, Scientific and Technical Information Branch, 1979. (NASA conference publication 2089) p. 179-196.illus. QB721,S97 1977

O'Toole, Thomas. ...not to mention Halley's Comet. Washington post magazine, May 24, 1981:8-14.illus. (part col.) N&CPR

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Overbye, Dennis. Great balls of fire. Discover, v. 2, Dec. 1981:20-24,26.illus.(part col.),col. port.

Q1.D57, v. 2

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Reinhard, Rudeger. The Giotto project--a fast flyby of Halley's Comet. In European Space Agency. ESA journal, v. 5, no. 4, 1981:273-285.illus.

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References(3):p. 285.

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Seargent, David A. Halley's Comet--the most famous of them all. In his Comets: vagabonds of space. Garden City, N.Y., Doubleday, 1982.p.[161]-182.illus.

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Wilford, John N. Halley's Comet: the long hello begins. New York times, v. 132, Oct. 26, 1982:C1, C3.illus.

N&CPR

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The International Halley Watch amateur observer's bulletin. no. 1+ Dec. 1982+ Pasadena, Calif., Jet Propulsion Laboratory, California Institute of Technology.

"Future issues of this bulletin will appear on an irregular or quarterly basis."

The International Halley Watch newsletter. no.1+ Aug. 1, 1982+ Pasadena, Calif., Jet Propulsion Laboratory, California Institute of Technology.

"Future issues will appear on an irregular or quarterly basis."

Serious amateurs can obtain information on participating in the IHW by writing to S.J. Edberg, MST-1166, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, Calif. 91109.

International Halley Watch Science Working Group. The International Halley Watch; report of the Science Working Group. [Washington? National Aeronautics and Space Administration, 1980]72p.illus., facsim.,port.(NASA TM82181) Sci RR NASA acquisitions no. N80-32310.

Edited by John C. Brandt, Louis D. Friedman, Ray L. Newburn and Donald K. Yeomans.

Following introductory statements on the scientific rationale for investigating comets in general and P/Halley in particular, historical background and a list of the aims of cometary research in the 1980s, plans are presented for coordinating professional and amateur observations over a broad range of studies. Appendixes include an ephemeris at 5-day intervals and a facsimile of the Circular Respecting Observations of Halley's Comet, 1910, Issued by the Astronomical and Astrophysical Society of America (now the American Astronomical Society). The cover depicts in color Delphine Delsemme's tapestry copy of the two Bayeux Tapestry panels that feature the comet's appearance in 1066.

Roosen, Robert G., and Brian G. Marsden. Observing prospects for Halley's Comet. *Sky and telescope*, v. 49, June 1975:363-364. illus. QB1.S536, v. 49

Tatum, Jeremy B. Halley's Comet in 1986. *Mercury*, v. 11, July/Aug. 1982:126-131. illus., ports.

QB1.M43, v. 11

"...outlines the history of our understanding of this most famous of comets, and predicts those places on Earth from which the comet will be best seen during its next visit in the winter of 1985-86." The cover of the issue reproduces a photograph of the head and part of the tail of the comet taken May 8, 1910, with the 60-inch telescope at Mount Wilson.

Yeomans, Donald K. The Comet Halley handbook, an observer's guide. Created for the International Halley Watch. [Pasadena, Calif., National Aeronautics and Space Administration, Jet Propulsion Laboratory, California Institute of Technology] 1981. 44p. illus. (JPL 400-91).

Intended to assist anyone wishing to seek out the comet for a once-in-a-lifetime glimpse, "as well as for the small army of serious amateur and professional astronomers," the handbook discusses the comet's orbit, its expected physical behavior (brightness, tail length and coma diameters) in 1985-86 and observing conditions during this period. A series of drawings shows how the comet may appear on various dates to observers at latitudes of 40°, 30° and 20° north of the equator and at 20° and 30° south. Ephemerides are given at 10-day intervals for the period Dec. 25, 1980-June 8, 1982; at 5-day intervals for June 18, 1982-Sept. 30, 1984; and at daily intervals for Oct. 5, 1984-Mar. 23, 1987. The cover reproduces a cut from a French canard of 1835.

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Chambers, George F. Halley's Comet. In his The story of the comets, simply told for general readers. Oxford, At the Clarendon Press, 1909. p. [102]-125. illus., port.

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Chant, Clarence A. Halley's Comet. In Royal Astronomical Society of Canada. Journal, v. 4, Mar/Apr. 1910:104-115. illus., facsim., port. QB1.R485, v. 4

A history for the general reader, first published in the February issue of Westminster (Toronto).

Crommelin, Andrew C.D. Address on the return of Halley's Comet in 1910. In Victoria Institute, or Philosophical Society of Great Britain, London. Journal of the transactions, v. 42. London, 1910. p. 18-34. ASI22.L9, v. 42

Presented May 9, 1910, at the annual general meeting of the society.

Crommelin, Andrew C.D. The expected return of Halley's Comet. *Science progress*, v. 3, Apr. 1909:543-556. Q1.S79, v. 3

Reviews the comet's history and provides a list of 29 returns with perihelion dates, number of days between successive returns, where seen and notes; also treats Angstrom's discovery of regularities in the varying lengths of the comet's revolutions.

Dean, John C. The story of Halley's Comet. *Popular astronomy*, v. 16, June/July 1908:331-345. illus. QB1.P8, v. 16

Emerson, Edwin. Comet lore: Halley's Comet in history and astronomy. New York, Printed by the Schilling Press [1910] 144p. plates, port. QB723.H2E6  
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Jacoby, Harold. The coming of Halley's Comet. *Harper's weekly*, v. 53, Nov. 20, 1909:13. illus., port. Micro 02231

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Proctor, Mary. Return of Halley's Comet In 1910. In her The romance of comets. New York, Harper, 1926. p. 94-132, plates QB721.P8

Includes details of the author's own observations, made from the summit of the Times building during May.

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See the Index for additional references to Halley's Comet.

Turner, Herbert H. Halley's Comet In Royal Institution of Great Britain, London. Proceedings, v. 19, Nov. 1912:753-764. Q41.R8, v. 19

A lecture presented at the weekly evening meeting of Feb. 18, 1910.

Discusses Halley's researches and prediction, Cowell and Crommelin's orbit calculations, searches for records of early sightings and the future of the comet. Turner makes the interesting point that although the comet does not go very far beyond the orbit of Neptune, "by the peculiarities of elliptic motion under gravity it spends half its time doing the small arc which lies beyond Neptune's orbit."

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Barnard, Edward E. Visual observations of Halley's Comet in 1910. Astrophysical Journal, v. 39, June 1914:373-404, illus., plates. QB1.A9, v. 39

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Bibliographic footnotes.

Contents: Material and methods of measurement and plan of the investigation.--Chronological description of cometary phenomena.--The spectrum of Halley's Comet.--Description of illustrations.--General structure of the comet and discussion of results.--Summary.

British Astronomical Association, London. Report of the section for the observation of comets. Halley's Comet. [By A.C.D. Crommelin and D. Smart] London, Printed and published for the Association by Eyre and Spottiswoode, 1912. 40p. illus., plates (Its Memoirs, v. 19, pt. 1). QB1.B8, v. 19

Includes data on the history of the comet, the prediction of its 1910 return, its brightness, length of tail in degrees, appearance of nucleus and coma, appearance and width of tail, spectrum of head and tail, the transit of May 18, and whether the earth passed through the comet's tail.

Comet Halley photographed May 19, 1910 at Lowell Observatory. [Tucson?] Kitt Peak National Observatory, 1978, col. poster 58x47 cm.

"Computer enhancement and color produced by the picture processing lab of the Kitt Peak National Observatory."

Copies can be ordered from KPNO and such suppliers as the Hansen Planetarium in Salt Lake City and the Astronomical Society of the Pacific in San Francisco.

Cordoba, Argentine Republic. Observatorio Astronomico. Observaciones del cometa Halley durante su aparicion en 1910, su posicion, brillantez, espectro, etc., hechas en el Observatorio Nacional Argentino por Carlos Dillon Perrine... con la asistencia de... Roberto Winter, Federico Symonds y Ana E. Glancy. Apendice (Cometa Mellish). Cordoba, Publicado por el Observatorio, 1934. 108 p. 97 plages (Its Resultados, v. 25) QB4.C79, v. 25

Spanish and English.

Contains a beautifully reproduced series of photographs of the comet taken during the period Apr. 17-July 6, 1910.

Curtis, Heber D. Photographs of Halley's Comet made at the Lick Observatory. In *Astronomical Society of the Pacific. Publications*, v. 22, June 1910: 117-130. plates. QB1.A4, v. 22

"In the interval from September 12, 1909, to July 7, 1910, Halley's Comet was photographed at the Lick Observatory on ninety-five nights, with a total of three hundred and seventy negatives..."

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The expedition went to Oahu to photograph Halley's Comet during the period April-mid-June 1910.

Frost, Edwin B. Observing a comet; a sketch of the world-wide study of Halley's Comet. *World to-day*, v. 19, July 1910:785-790. AP2.H4, v. 19

#### Halley's Comet in 1910: Frenzy and Foolishness

Alter, Dinsmore. Comets and people. Griffith observer v. 20, July 1956:74-82.illus. QB1.G7, v. 20

Mostly about popular reactions to the 1910 return of Halley's Comet, as reflected in contemporary newspapers. The cover reproduces photographs of the comet taken by Ellerman at Honolulu in 1910.

Reprinted, with different illustrations, in the October 1972 issue (v. 36).

Comets used to be feared and unwelcome visitors. *Wisconsin then and now*, v. 20, Dec. 1973:2-3. F576.W825, v. 20

A review of the reception of Halley's Comet in Wisconsin in 1910. A furniture ad for "seats for comet gazers" and a cartoon entitled "Comet Parties Are Now All the Rage" are reprinted from local newspapers of the day, and a recipe for a 1910 "Comet Cocktail" is given. A panel of the Bayeux Tapestry is reproduced on the cover of the issue.

Klein, Jerry. When Halley's Comet bemused the world: fifty years ago, earthlings awaited with both pleasure and fear a visitor from space. *New York Times Magazine*, May 8, 1960:45, 57, 60, 62.illus. AP2.N6575, 1960

Oppenheimer, Michael, and Leonie Haimson. The comet syndrome. *Natural history*, v. 89, Dec. 1980:54-61. illus. QH1.N13, v. 89

"Additional reading":p. 74-75

"Human reactions to encounters of the cometary kind range from hysteria to frivolity." About half of the article concerns Halley's Comet.

Parise, Lidia, and Abel Gonzalez. "La fin del mundo." [Buenos Aires]Centro Editor de America Latina[1972] 113 p. illus., plates, ports. (La Historia popular, 67). F3001.3.P37 1972

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Stephenson, Bill. The panic over Halley's Comet. *Maclean's*, v. 68, May 14, 1955: 30-31, 96-101. illus. (part col.), facsimis. AP5.M2, v. 68

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Transcribes entries from a notebook found in the record room of the Greenwich observatory. The surviving pages record observations made during late August and early September.

Olson, Roberta J.M. Glotto's portrait of Halley's Comet. *Scientific American*, v. 240, May 1979: 160-163, 165-168, 170. illus. (part col.) T1.S5, v. 240

The author believes that Glotto's portrayal of the star of Bethlehem as a realistic comet in one of the Arena Chapel frescoes in Padua is based on the appearance of Halley's Comet, which the artist could have seen in 1301. She also calls attention to a sketch in the Canterbury Psalter as a possible representation of the comet at its return in 1145. The latter identification was first proposed by Charles Cotton in a letter headed "The Halry Star"--Halley's Comet in the Twelfth Century; Date of Canterbury Psalter," in the *Times* (London), June 6, 1934, p. 15.

Plummer, Henry C.K. Halley's Comet and its Importance. *Nature*, v. 150, Aug. 29, 1942: 249-257.

Q1.N2, v. 150

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Cole, Russell L., and Don M. Schiffman. *Hal the friendly comet; the adventures of Halley's Comet, 1909-1986*. Mukilteo, Wash., Cole Productions, 1984. (Young collectors ed.)

Heckart, Barbara H. *Edmond Halley, the man and his comet*. Chicago, Childrens Press, 1984.

Presents the life of the 17th-century scientist who made predictions about the comet which bears his name and discusses many other important scientific contributions he made.

Moore, Patrick, and John Mason. *The return of Halley's Comet*. Cambridge [Eng.] P. Stephens, 1984. [120]p.

ISBN: 0-85059-667-X; price, 7.95. Published in the U.S. by Norton at \$14.95; ISBN 0-393-01872-5.

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ISBN: 0-631-13558-8; price, 7.95. To be published in the U.S. in August at \$12.95.

Wiegand, Roberta. *The year of the comet*. Scarsdale, N.Y., Bradbury Press, 1984. Juvenile fiction.

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# Mindsteps to the Cosmos

Reviewed by Jim Summers

Gerald Hawkins.... Does that name sound familiar? Remember Stonehenge Decoded? Well, Dr. Hawkins is back with what may in fact be a more interesting and useful book for planetarians. Mindsteps to the Cosmos is basically an elaboration on the theme that human intellectual development is apparently tied to astronomical insights. There are some people who would go so far as to claim that it is only our developing curiosity about the heavens which has provided the intellectual stimulus for the major historical changes in our perceptions of the world and ourselves. It is probably more likely that the intellectual development of our species is accompanied by an increasing awareness of the universe. In any event, it is possible to link major turning points in human history with corresponding celestial understanding. These turning points are what Hawkins calls "mindsteps."

He begins with Mindstep Zero, which he calls the "Age of Chaos." This is the period of pre-history from which we have little in the way of artifacts and no written or verbal traditions. Images resembling stars and the moon found among other cave paintings and a few instances of marks carved into stones, bones and antlers which are suggestive of records of moon phases constitute the whole of our knowledge of the cosmic understanding of the people from this age.

Mindstep One begins, according to Hawkins, in approximately 3,000 B.C. He calls it the "Age of Myth and Legend." During this time we have the cosmic understanding of the people encapsulated within the verbal traditions of myth and legend. To make his point, Hawkins conducts an astronomical analysis of several stories from this period and makes a good case for clear astronomical observations embodied within them. There is sufficient material here for ideas for a number of good planetarium programs.

Mindstep Three begins about 150 A.D., in the era of Claudius Ptolemy. Hawkins calls it the "Age of Order." This is followed in

1543, the time of Copernicus, with Mindstep Four, the "Age of Revolution."

Mindstep Four begins in 1926, with Goddard's rocketry experiment, and is called the "Age of Space."

Is this the end of the sequence? Not if Hawkins' speculations prove to be correct. By analysing the lengths of the various mindstep periods, he suggests that the next mindstep may occur in about 2021. Mindstep Six is suggested for 2045. Mindstep Seven for 2051, and the last of the numerical series, Mindstep Eight for 2053.

The historical portions of Mindsteps are extremely valuable in and of themselves. Dr. Hawkins' insight into the ancient mind, which was first demonstrated in his work at Stonehenge, is further honed in this latest work.

His speculations about the present and the immediate future give rise to subjects for serious consideration by the astronomical community.

Mindsteps to the Cosmos is pleasant reading, informative, challenging and stimulating. It is highly recommended in this regard.

But there is more! Hawkins has provided an appendix of programs for making the sorts of calculations necessary to determine the astronomical alignments of a site such as Stonehenge. These programs are written in a way that the calculations can be made with nothing more than a handheld calculator with trig functions. They can also be easily converted into Basic for use with any personal computer. These programs include:

Program NOONALT: gives the altitude in degrees of a celestial object above the southern horizon when it is due south at noon.

Program SUNMAX: provides the maximum declination of the sun in its annual journey around the zodiac.

Program MOONMAX: provides the maximum declination reached by the moon during a given year.

Program AZIMUTH: gives the azimuth of an object such as a star or the center of the

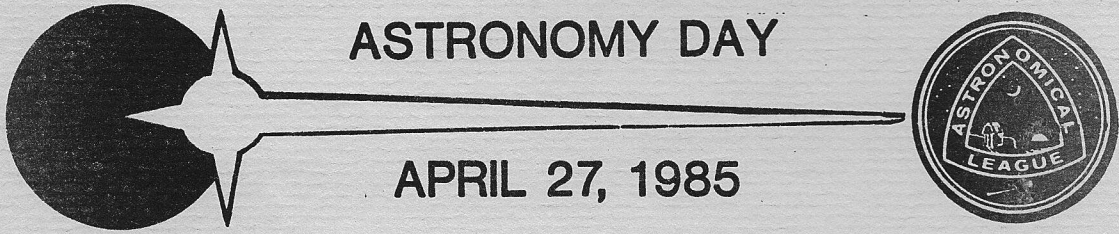
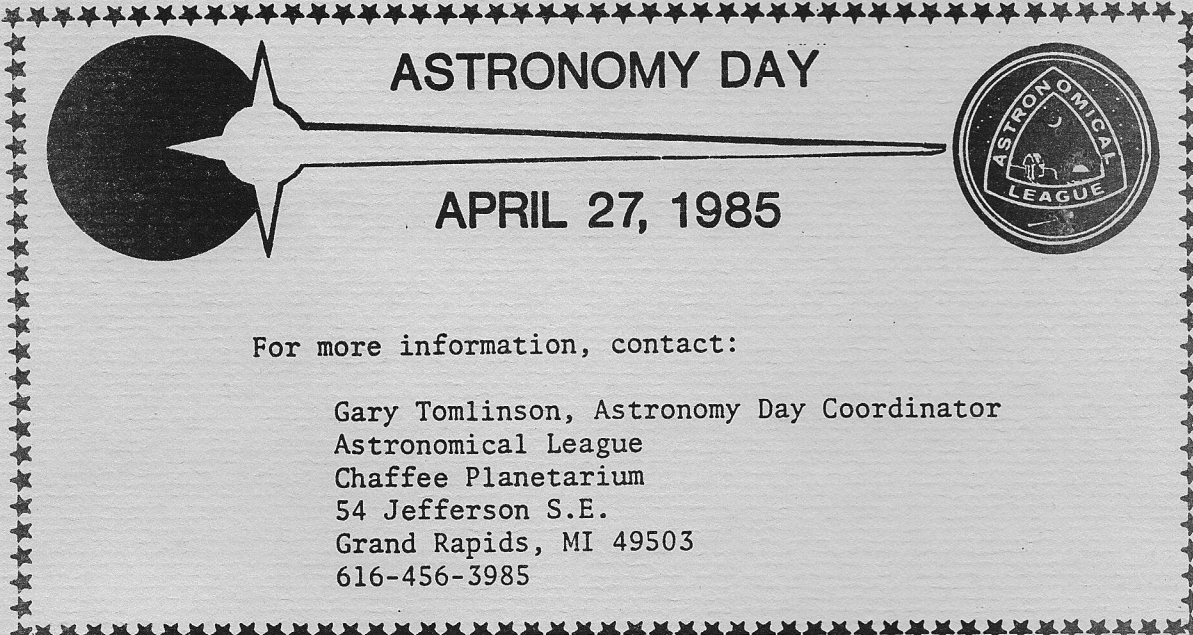
sun or moon when at a specified altitude, including rising and setting.

And, for those of you who are really into archaeoastronomy, there are a number of additional useful programs including one called EGYPTDATE, which converts a known date B.C. into the corresponding date in the Egyptian Civil Calendar.

These programs may be of even more value than the rest of the book. If you have

ever gotten a call from an enthusiastic photographer, amateur or professional who wants to photograph the rising full moon over some particular landmark and wants to know precisely where the moon will be rising, you would be willing to buy the book just to get AZIMUTH alone.

Mindstep to the Cosmos  
Gerald S. Hawkins  
Harper & Row, Publishers  
New York, c. 1983



# ASTRONOMY DAY

## APRIL 27, 1985

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