



# The Refractor

The Bulletin of the Eastbay Astronomical Society

Founded in 1924 at Chabot Observatory, Oakland, California

Volume 72  
Number 8  
April 1996

## Astronomy on the Internet

Saturday, 6 April, 7:30 p.m.

Physics Classroom, Chabot Observatory

Lecture: Space Science Classroom

4917 Mountain Boulevard, Oakland

### Chuck Vaughn

Astrophotographer

We are privileged this month with a return visit from a renowned amateur astrophotographer whose work is frequently seen in publications such as *Astronomy* and *Sky & Telescope*. Chuck Vaughn last spoke to the EAS in January 1993, when he presented a slide tour of the Milky Way. Like Comet Hyakutake's swift path across the early April sky, the course of technology and communications is moving rapidly under our watch. A major factor in this change is the Internet tsunami that is now sweeping over us. Chuck sees this as a most welcome opportunity for amateur astronomers. In his words:

"Last summer my company upgraded our desktop computers and the company network and gave our employees access to the Internet. I had recently read a starter book for the Internet, so combined with that and some other help I was actually "surfing" on-line in July. It wasn't long before I signed up with a local Internet Service Provider (ISP) so I could have personal use at home too.

"Before long I was visiting the amateur astronomy newsgroup and exchanging e-mail with other astrophotographers whose names I had previously only seen in magazines or books. I soon discovered that there was a wealth of information about astronomy available on the Internet and it was all free. However, at that time there wasn't a lot available about astrophotography. I decided that I wanted to make my contribution to the Internet by making some of my astrophotos available in the form of a Web page. My ISP provided disk space on their server for this, and with some time spent on learning Web page construction I was up and running. Since that time about 35 different countries have visited my web page, as well as thousands from across the United States.



Conrad Jung took this photo of Comet 1996 B2 (Hyakutake) from Fremont Peak on the morning of Sunday, 17 March. Surely, this comet will surpass the splendor of any comet of the previous decade as it parades over April's northern sky. Although Conrad's image required a half-hour of exposure, the comet, as it approaches the Sun, is expected to develop a tail structure of considerable length. At the start of the month, Hyakutake is already visible to the naked eye, even in the light-polluted, cloud-challenged Bay Area.

"If most of the last two paragraphs was Greek to you, I think you will enjoy the live Internet demonstration that I hope will take some of the mystery out of it. I will concentrate on how amateur astronomers can benefit from the Internet, but it would be impossible not to give you an overview of the whole thing. As part of the demonstration we'll visit JPL, get the latest observations of comet Hyakutake from around the world, see what's up with the Galileo probe around Jupiter, retrieve an image from the Palomar Sky Survey and see how to find many things of interest to you. I hope audience questions will steer us to some places on the Internet that I have yet to visit."

Join us for

### DINNER WITH THE SPEAKER

5:28 p.m., 6 April 1996

### ROUND TABLE PIZZA MONTCLAIR

2071 Mountain Blvd., Oakland (510 / 339-9494)

Please call Betty Neali at 510 / 533-2394 by Friday, 5 April to confirm your place. Please be on time to allow ample time for dinner and to facilitate a prompt meeting time of 7:30 p.m.

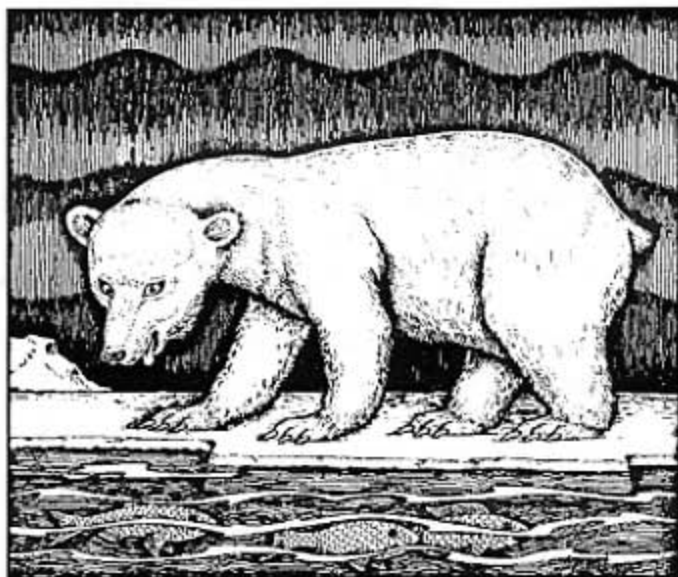
## Comet 1996 B2

dims a bit in the sky as it comes down from its high northern position in Perseus at month's beginning, then brightens again as it approaches its perihelion at month's end. We see it appear to sink into the western twilight, although if it brightens enough it may be seen a few evenings past April 24, before it is lost in the glare of the Sun. When it returns from its close encounter with the Sun, the comet will be visible only to Southern Hemisphere observers of the predawn sky.

Prior to a meeting with Algol on April 10, Hyakutake paid a remarkable visit to the stars of Ursa Minor, and that is the constellation we will feature this month—the Little Bear of the Polar Regions. [For some stories about Perseus, where the comet will be for most of April, please see *The Refractor* for November 1995.]

The Native American Pawnee occupied a homeland in the grasslands along the Platte and other tributaries of the Missouri in southeastern Nebraska. Of all Indian groups, their culture was the most attuned to an affinity with the stars; they governed their life with much contemplation of the sky. They were an agricultural people, planting corn, beans and squash in plots surrounding their villages. Yet, each summer, after planting was completed, they would follow the bison, living in tipis like those of their Plains Indian cousins. They would return at the equinox to harvest their crops. When the stores had been laid in for the winter, then was the time for storytelling. The adults remembered the old stories and they would tell them to the youngsters who had grown up enough to listen to this wisdom of their elders.

Each Pawnee village was associated with a different star, and when all the villages were assembled on ceremonial occasions they camped in an arrangement according to the celestial arrangement of their chosen stars. Much of the lore of the Pawnee is unavailable, because it was considered sacred and the priests were not willing to share it with outsiders. Some of this knowledge, however, was painted onto a buckskin and kept in a bag made from the scalp of a buffalo. This sky chart was once used to wrap a stone that was considered to be a meteorite. Study of this chart and its depiction of their constellations has emphasized how important the stars were to Pawnee life. On the buckskin star chart, the Star That Does Not Walk Around—the North Star—is represented by a large star, obviously more important than other stars in its vicinity. Around this star are groups of stars representing stretchers. According to the myth, in the first council, when they were deciding where in the sky the various gods would stand, two people became sick. The stars put them on stretchers in order that they could be carried along with them. Their journey is not yet over, for the two stretchers—the bowls of the Little and the Big Dipper—are still carried around the Star That Does Not Walk Around by the Medicine Man, his wife, and Errand Man—the stars of the Big Dipper handle. The Little Stretcher was considered to be bearing a sick child. In life, the natives followed the example and methodically carried their sick and dead with mourners following. The Milky Way is the path the spirits of the dead take as they are blown along from north to south by the north wind.



Perhaps by coincidence, perhaps by differing interpretations of an eternal truth, the Arab myth is similar. The stars of Ursa Major were considered the Great Bier and Mourners and the stars of Ursa Minor were a lesser coffin. The Pole Star itself was to them the most fearsome villain in the sky. It was that rogue who had slain the warrior now lying in the coffin of Ursa Major. All the stars mourn for their hero and move in funeral procession each night. Ostracized, the Pole Star must remain fixed in place in the cold and unfriendly north sky, while his angry fellow stars scorn him from a considerable distance.

Only seven naked-eye stars mark the constellation, with Polaris first and foremost, magnitude 2.1. Next in brightness are the two outermost stars of the bowl: Kochab,  $\beta$ -Ursae Minoris, magnitude 2.2, and Pherkab, magnitude 3.1. These two, called Guardians because they seem to protect Polaris as they circle the sky, have been used as timekeepers by people of old, because they are visible throughout the night. Columbus mentioned these stars in the log of his famous journey across the Atlantic, and many navigators have found them useful in measuring the hour of the night and their place upon the ocean.

For telescope viewing, the area of Ursa Minor has only Polaris to spark one's interest. Polaris is a Cepheid-double, with a 9th magnitude companion at 18 arcseconds distance, a critical test of resolution for a 70-mm telescope. Its position near the celestial pole is of great value. The star is within 50 arcminutes of the pole and closing. It will be closest, 27 arcminutes away, in the year 2095. Its current coordinates are  $02^{\circ}27.9'$  RA,  $+89^{\circ}15'$  Dec (1996.5). Only for the last couple of thousand years has it been the North Star, having taken over the title from Kochab, whose name actually means "Star" in Arabic.

Articles and photos for *The Refractor* are encouraged. Deadline for the May issue is April 17, 1996. Items may be submitted by mail to the editor, Ellis Myers, 215 Calle La Mesa, Moraga, CA 94556. Files on disk should be ASCII PC format, 3.5-inch 1.4M. Internet e-mail address is emyers@crl.com. For further information please call (510) 284-4103.

## Mike Reynolds reports for COSC:

Several EAS members participated in a Workday Saturday, 16 March at the new Chabot Observatory & Science Center site to prepare for forthcoming groundbreaking ceremonies. A lot of downed brush and eucalyptus was cleared and stacked. More small eucalyptus trees were removed to allow for telescopic site testing, necessary to situate the observatories correctly. There will be another workday Saturday, April 6th from 9 am to 3 pm. We need your help! A lot of debris and fallen eucalyptus still remain; we also need to take out brush. We need volunteers to bring tools—in particular, chain saws and wheelbarrows. Please dress appropriately; protect yourself from abrasions, contact with poison oak, and the sun. Lunch will be provided. There are rumors that "Chef" Reynolds will again attempt to burn some burgers and hot dogs. Please call Chabot Observatory & Science Center today at 530-3480 and volunteer! Thanks in advance.

The Science Center's 1996 Benefit, *Leap into the Future*, was held on February 29th and attended by more than 375 people. The Benefit, to raise money as well as awareness of the new Chabot Observatory & Science Center, also honored local teachers, students and scientists. Regina and Shanina Shumate, two Oakland students, were honored for their participation in the Junior Astronomers. Three preeminent scientists, Dr. Walter Alvarez, Dr. Gibor Basri, and Dr. Marian Diamond, were honored for their roles in each scientist's respective field. Each gave a presentation of some of their research, accented by hands-on activities led by Chabot's Executive Director Dr. Mike Reynolds. Dr. Edward Penhoet, chair of Chabot's Board, served as the event's Master of Ceremonies and Katherine Gueldner again did a fabulous job as the Benefit chair. Esteemed scientists such as Nobel Laureate Glenn Seaborg, corporate executives, politicians, educators, and other prominent citizens came away from the Benefit with a better understanding of the new Chabot Observatory & Science Center project and its current status. As Chabot enters the final phase of fundraising for the new facility, corporate and community support is of paramount importance for accomplishment of our goals.

Each year in January or February (depending on the phase of the moon), amateur astronomers gather in the lower Florida Keys for what is becoming one of the most interesting of annual star parties. The Winter Star Party, started eleven years ago and hosted by Miami's Southern Cross Astronomical Society, provides attendees with the opportunity to observe at a low latitude (23 degrees N) and to have some fun in the Florida sun! Objects like Omega Centauri and the Southern Cross are spectacular as they rise "out of the Atlantic Ocean." Over 500 attend this annual event, with a waiting list that approaches that number. The Winter Star Party also features invited speakers like Richard Berry, Jack Newton, Don Parker, and Mike Reynolds (ever heard of this guy?). Vendors are also invited to set up and show their wares, and a swap meet is also held. Even though the Winter Star Party is probably the smallest of the big national star parties, it probably has some of the most loyal followers. Who could complain about spending a week in the Florida Keys during the winter, enjoying the night skies and the warm, Florida waters? Plus, where else can one get conch fritters?

Please welcome the following new EAS members:

Roy Morfett

Richard Tremaine Family

Oakland

Clayton

## Carter Roberts, EAS President:

I would like to thank everyone who helped make the Annual Banquet a success. About 60 members and guests enjoyed a fine dinner on March 9 at the San Lorenzo Community Church; the Helen Pillans Award was presented to John Westfall for his continuing service to amateur astronomy; and Professor Alex Filippenko engrossed the audience with an explanation of the role of supernovae in our universe. A cake, decorated to recognize the 80th anniversary of the public opening of Chabot Observatory at the present site on March 8, 1916, completed the menu.



Unfortunately, the groundbreaking ceremonies first planned to coincide with the anniversary of the establishment on May 21, 1883, of the Oakland Observatory have had to be postponed because of delays at the architects' offices.

On 20 April the EAS will again participate in national Astronomy Day with a variety of activities. The major focus will be at Chabot Observatory with an open house from 7 to 11 pm; and the Telescope Makers Workshop will be open from 7 to 10. Members and friends are encouraged to bring telescopes or help answer questions. As usual EAS will be represented in other locations. We expect to have someone at the California Academy of Sciences during the day and Bob Schalck will be setting up in Geyserville! Astronomy Day is dedicated to making the intrigue of the night sky known to the general public. If you can help do this, perhaps by setting up your own telescope at your choice of location for others to use, everyone will benefit.

Let me call your attention to the upcoming Riverside Telescope Makers Conference. This will be the 28th annual meeting for this popular event and will be May 24-27 at Camp Oakes in Big Bear. The theme this year is "Getting Started in Astronomy—Expanding Your Astronomical Universe." Among the notable astronomers who will participate are Thomas Bopp, Robert Burnham, Richard Feinberg, Alan Hale, David Levy, Jack Newton, Don Parker, and Leif Robinson. Professor Ashley McDermott will be the Keynote Speaker. For more information, you may leave a message at (909) 948-2205; but be advised to make your arrangements and reservations before May 1. A feature for the second year will be a computer link to control the Mount Wilson 24" telescope remotely from Camp Oakes.

## EAS Officers

President: Carter Roberts

Vice President: Phil Crabbe II

Secretary: Kevin Cox

Treasurer, Membership: Don Stone

(510) 524-2146

(510) 655-4772

(510) 528-2181

(510) 733-6738

# The Astronomical Society of the Pacific

108th Annual Meeting will offer sessions for the general public, amateur astronomers, educators, and researchers. To be held at The Westin Hotel in Santa Clara from June 21 through June 26, 1996, it will feature sessions of interest to amateur astronomers of all levels, school teachers interested in teaching more astronomy, college teachers, and research astronomers. All sessions are open with a modest admission fee.



A weekend of astronomical lectures, events and activities, entitled "Universe '96," is designed to appeal primarily to members of the general public and amateur astronomers. Over 20 leading astronomers will speak on topics such as the latest results from the Galileo Jupiter probe, recent discoveries of planets orbiting other stars, astronomy of ancient civilizations, results from studying the 1994 comet collision with Jupiter, and exploding stars.

"Universe '96," which is presented in cooperation with *Astronomy* magazine, will also feature commercial exhibits by dozens of companies showcasing amateur telescopes, software, posters, books, gifts, and other products. Participants will also be able to take a tour of Lick Observatory, home of the historic 36-inch refractor, or the NASA-Ames Research Center, including the world's largest wind tunnel and the Kuiper Airborne Observatory.

Research or amateur astronomers who are interested in sharing their enjoyment of astronomy and science with school children will want to attend the 1½-day workshop on how to conduct classroom activities that make astronomy fun, interesting, and exciting for kids. This session, offered by the NSF-funded Project ASTRO, will also give participants useful tips on how to identify and work with teachers in their local communities who want to form ongoing partnerships with astronomers.

A two-day workshop, "The Universe in the Classroom," will focus on the teaching of astronomy in grades 3-12. There will be sessions for both veteran science teachers and those who have never taught astronomy before.

A one-day session will focus on the unique problems and opportunities of teaching astronomy in community and small colleges. Sessions, aimed at both full-time and part-time instructors, will focus on addressing the challenges of diverse students, selecting texts, use of computer-aided instruction, and improved networking among astronomy teachers.

This year's scientific symposium, cosponsored by the NASA-Ames Research Center, is entitled "From Stardust to Planetesimals." Leading researchers from around the world will discuss our current understanding of the formation and early evolution of our solar system and planetary systems around other stars.

For more information write to: Meeting Information, Astronomical Society of the Pacific, 390 Ashton Avenue, San Francisco, CA 94112; phone (415) 337-1100; or e-mail lbaker@stars.sfsu.edu. More information is also available on the ASP's web site, <http://www.physics.sfsu.edu/asp/asp.html>.

## Internet Addresses Are Key

to "surfing" the Net, but they are sometimes somewhat cryptic and obscure. So, to complement our speaker's presentation this month, we'd like to list a few such addresses to begin what we anticipate would be an occasional directory of sources of interest to amateur astronomers. We solicit your contributions to this list; and you can send your suggestions on the Internet, by e-mail to [emyers@crl.com](mailto:emyers@crl.com).

### World Wide Web sites:

Chabot Observatory and Science Center  
Astronomical Association of Northern California  
Astronomical Society of the Pacific  
American Astronomical Society  
Astronomical League  
Morrison Planetarium  
Astronomy Magazine  
Sky & Telescope Magazine  
Comet Hyakutake  
Comet Hale Bopp  
Skywatchers Diary from Abrams Planetarium  
Shuttle Elements and Tracking Software  
NASA Shuttle Web  
Satellite Passes

<http://www.cosc.gov>  
<http://128.32.190.143/aanc/rq96.html>  
<http://www.physics.sfsu.edu/asp/asp.html>  
<http://www.aas.org>  
<http://www.mcs.net/~bstevens/al>  
<http://www.calacademy.org>  
<http://www.kalmbach.com/astro/astronomy.html>  
<http://www.skypub.com>  
<http://newproducts.jpl.nasa.gov/comet/hyakutake>  
<http://www.halebopp.com>  
<http://www.pa.msu.edu/pub/swd>  
<http://www.cts.com/browse/garym/elements>  
<http://shuttle.nasa.gov>  
[http://ssl.berkeley.edu/isi\\_www/satpasses.html](http://ssl.berkeley.edu/isi_www/satpasses.html)

### FTP Sites:

NASA  
Jet Propulsion Laboratory  
Space Telescope Science Institute  
Astronet Newsletter  
Satellite 2-line Elements

<ftp://ftp.hq.nasa.gov>  
<ftp://ftp.jpl.nasa.gov>  
<ftp://ftp.stsci.edu>  
<ftp://ftp.rahul.net/pub/resource>  
<ftp://archive.afit.af.mil/pub/space>

## Comet Comments *By Don Machholz*

Five comets are visible in our skies this month. One—Comet Hyakutake, C/1996 B2—is the brightest comet in twenty years! It passed near the Earth in late March, and as it continues in toward the Sun it will remain a naked-eye object, sporting what should be a fairly bright tail in the evening sky. By mid-April it will be low in the western sky after sunset.

The first Comet Hyakutake (1995 Y1) remains in the morning sky while Comet Szczepanski fades in the evening sky. Periodic Comet Kopff brightens in the southern morning sky. It nears Comet Hale-Bopp in June.

I have just finished writing an 82-page book for those wishing to make the most of Comet Hale-Bopp's visit to our skies. Containing 64 maps and 21 figures, it prepares both the beginner and the seasoned astronomer for the comet. Entitled *An Observer's Guide to Comet Hale-Bopp*, it is available by sending \$12.00 plus \$2.00 shipping and handling to MakeWood Products, P.O. Box 1716, Colfax, CA 95713. For first-class mail the S&H totals \$3; for overseas air mail it is \$6. Phone orders, using a credit card, are accepted at (916) 346-8963.



Date (00UT)	R.A. (2000)	Dec.	Elong.	Sky	Mag.
<b>C/1995 Y1 (Hyakutake) [Pegasus]</b>					
03-28	21h21.9m	+25°17'	50°	M	9.2
04-02	21h39.5m	+26°58'	50°	M	9.4
04-07	21h55.9m	+28°27'	49°	M	9.6
04-12	22h11.3m	+29°44'	49°	M	9.9
04-17	22h25.6m	+30°53'	50°	M	10.1
04-22	22h38.8m	+31°53'	50°	M	10.3
04-27	22h51.1m	+32°47'	51°	M	10.5
05-02	23h02.5m	+33°35'	52°	M	10.7
<b>C/1996 B1 (Szczepanski) [Hydra]</b>					
03-28	09h34.7m	-01°08'	137°	E	8.9
04-02	09h28.3m	-04°55'	131°	E	9.2
04-07	09h24.1m	-08°04'	125°	E	9.5
04-12	09h21.6m	-10°43'	121°	E	9.8
04-17	09h20.78m	-12°56'	116°	E	10.0
04-22	09h21.0m	-14°51'	112°	E	10.3
04-27	09h22.3m	-16°31'	109°	E	10.6
05-02	09h24.5m	-17°59'	106°	E	10.8
<b>C/1995 O1 (Hale-Bopp) [Sagittarius]</b>					
03-28	19h41.6m	-19°54'	74°	M	8.4
04-02	19h42.9m	-19°33'	78°	M	8.3
04-07	19h44.0m	-19°11'	83°	M	8.2
04-12	19h44.7m	-18°48'	88°	M	8.1
04-17	19h45.0m	-18°26'	93°	M	8.0
04-22	19h45.1m	-18°03'	97°	M	7.9
04-27	19h44.7m	-17°40'	102°	M	7.8
05-02	19h43.8m	-17°16'	107°	M	7.7
<b>C/1996 B2 (Hyakutake) [Camelopardalis-Perseus-Aries]</b>					
03-28	04h04.5m	+78°43'	80°	E	1.1
04-02	03h11.3m	+51°58'	56°	E	2.1

04-07	03h05.2m	+43°27'	45°	E	2.5
04-12	03h00.6m	+39°02'	37°	E	2.5
04-17	02h55.0m	+35°47'	30°	E	2.1
04-22	02h47.4m	+32°29'	23°	E	1.3
04-27	02h37.0m	+27°59'	15°	E	0.1
05-02	02h25.9m	+20°52'	06°	E	-0.3
<b>22P/Kopff [Sagittarius]</b>					
03-28	17h26.8m	-16°55'	106°	M	10.5
04-02	17h36.4m	-16°53'	108°	M	10.2
04-07	17h45.9m	-16°49'	111°	M	10.0
04-12	17h55.2m	-16°43'	113°	M	9.7
04-17	18h04.3m	-16°36'	116°	M	9.5
04-22	18h13.0m	-16°28'	119°	M	9.2
04-27	18h21.5m	-16°19'	122°	M	8.7
05-02	18h29.5m	-16°10'	125°	M	8.5

### Elements for C/1995 Y1 (Hyakutake):

Perihelion: 1.054576 AU [1996 02/24.28973]; Arg. (2000): 046.35126°

Ascending node (2000): 195.75924° Eccentricity: 1.0

Inclination (2000): 054.4667° Orbital period: Long period

### Elements for C/1996 B2 (Hyakutake):

Perihelion: 0.23014060 AU [1996 05/01.40305]; Arg. (2000): 130.18992°

Ascending node (2000): 188.05114° Eccentricity: 0.9998449

Inclination (2000): 124.90012° Orbital period: 57000 years

### Elements for C/1995 Y1 (Szczepanski):

Perihelion: 1.4486192 AU [1996 02/06.89903]; Arg. (2000): 151.27225°

Ascending node (2000): 345.44413° Eccentricity: 0.9899357

Inclination (2000): 051.90616° Orbital period: 1727 years

### Elements for C/1995 O1 (Hale-Bopp):

Perihelion: 0.9141160 AU [1997 04/01.12081]; Arg. (2000): 130.58985°

Ascending node (2000): 282.47097° Eccentricity: 0.9951019

Inclination (2000): 089.42765° Orbital period: 3000 years

### Elements for 22P (Kopff):

Perihelion: 1.5795617 AU [1996 07/02.19980]; Arg. (2000): 162.83487°

Ascending node (2000): 120.91329° Eccentricity: 0.5440739

Inclination (2000): 004.72143° Orbital period: 6.45 years

## A Bay Area Astronomical Auction

and Swap Meet is sponsored each spring by the San Jose Astronomical Association. The 16th annual event will take place May 4 at Hogue Park in San Jose, and you are invited not only to attend but to include your items for sale as well. Items for auction should be pre-registered by mail to Jim Van Nuland at 3509 Calico Avenue, San Jose, CA 95124 (408) 559-1221. Items for the swap meet need not be registered; just bring them with you. It will be agreed that a 10% sales commission is to be retained by the SJAA. Swap meet hours are noon until 3 pm; the auction will start at 4 pm.

Bring those unused goodies and swap them for something new and different or turn the dust collectors in your garage and closet into cash. There is plenty of parking and handicapped-access at Hogue Park. No food service is planned, but a number of restaurants are available along nearby Camden Avenue.

## DATELINE APRIL

- 11 1862 William W. Campbell, born,  
Director, Lick Observatory
- 28 1906 Bart Jan Bok, born, Hoorn, Netherlands
- 2 1961 Soviet Vostok 1, Yuri Gagarin, first man in space
- 2 1981 Columbia, first Space Shuttle launch,  
John Young, Robert Crippen
- 3 1990 Hubble Space Telescope launched
- 3 1996 Full Moon, 16:07 PST - 00:07 UT 4 April  
Total lunar eclipse (not visible in Western States)
- 7 1996 Change to Summer Time (PDT): 02:00 PST - 03:00 PDT.  
(Or you could move to Arizona, Hawaii or Puerto Rico!)
- 7 1996 Easter Sunday
- 10 1996 Last Quarter Moon, 15:36 PST - 23:36 UT
- 17 1996 New Moon, 14:49 PST - 22:49 UT  
Partial solar eclipse seen only from South Pacific
- 25 1996 First Quarter Moon, 12:40 PST - 20:40 UT

## UPCOMING EVENTS

- 6 April. EAS meeting. **Chuck Vaughn.**
- 6 April. COSC project site work party.
- 11 April. EAS Board meeting.
- 20 April. Astronomy Day.
- 4 May. Astronomical Auction. San Jose.
- 4 May. EAS meeting.
- 11 May. NCHALADA. Chabot.
- 24-26 May. Riverside Telescope Makers Conference. Big Bear.
- 22-23 June. Astronomical Society of the Pacific.  
Universe '96. Santa Clara.

Planetarium shows at Chabot. Fridays and Saturdays, 7:30 p.m.  
Information, (510) 530-5225.

	April							May	
	5	6	12	13	19	20	26	27	3
African Skies	■				■			■	
The Universe of Dr. Einstein		■	■	■		■			
The Sky Tonight				■			■		

The next meeting of

### NCHALADA

Saturday, 11 May, 9:30 a.m. - 5:00 p.m.  
at Chabot Observatory

**The Aether and Its Many Uses**  
---  
**Observatories as Planned and Built**



Eastbay Astronomical Society, Inc.  
4917 Mountain Boulevard  
Oakland, CA 94619

ADDRESS CORRECTION REQUESTED  
Time Dated Material - Please Deliver Promptly

Non-Profit Org.  
U.S. POSTAGE  
**PAID**  
Permit No. 3660  
Oakland, CA