



The Refractor

The Bulletin of the Eastbay Astronomical Society

Founded in 1924 at Chabot Observatory, Oakland, California

Volume 74
Number 12
August 1998

How Big Is the Universe?

Saturday, 8 August, 1998

7:31 p.m.

How High Is the Sky?

8:20 p.m.

Chabot Observatory, 4917 Mountain Boulevard, Oakland

David V. Rodrigues

Program Director, Eastbay Astronomical Society

As part of a special effort to help COSC in its time of financial difficulty, EAS has agreed to provide public programs once per month in place of the regular planetarium programs. Our inaugural effort will coincide with this month's meeting of EAS, when we will try a special format that will double your fun!

The first hour will be designed to provide an entertaining and informative program for the general public as well as EAS members. Program Director Dave Rodrigues will present his highly acclaimed and humorous program entitled "How Big is the Universe?" This program is an overview of recent astronomical discoveries using space probe and Hubble Space Telescope images to illustrate the scale and nature of the Solar System and Universe. Questions such as "How big is the Sun?", "How far is the Moon?" and "Is there other life in the Universe?" will be addressed in a very different way than they are usually treated. It is also the only astronomy program with a cash rebate!

After the break, the second part of the program will be oriented more expressly towards EAS members while the general public gets to go upstairs and view through Chabot's telescopes. Various EAS veterans of the White Mountains trip to the Barcroft High Altitude Laboratory will detail their experiences. Pictures and slides taken at the second highest star party in the U.S. (and perhaps the world) will be shown.

Please attend this meeting! It is important that we demonstrate that EAS is a live organization that truly cares about guiding others toward the enjoyment of astronomy.

This year's late July White Mountain star party will be one of the segments of a Public Radio International Program entitled "Beyond Computers" to be broadcast nationally, and locally on Tuesday, August 4 from 1 to 2 P.M. on radio KALW, 91.7 FM. A transcript of this segment will be available on the Internet at www.computingcentral.msn.com.

Finally did you know that the fifties science fiction classic, "The Thing" was filmed at Barcroft Lab? Rent the video tape and find out what a typical EAS star party is like!

Alan B. Shepard, Jr.

the first American to fly in space and one of only 12 humans who walked on the Moon, died July 21 in Monterey, California, after a lengthy battle with leukemia. He was 74.

"The entire NASA family is deeply saddened by the passing of Alan Shepard. NASA has lost one of its greatest pioneers; America has lost a shining star," said NASA Administrator Daniel S. Goldin. "Alan Shepard will be remembered, always, for his accomplishments of the past; being one of the original Mercury astronauts, for being the first American to fly in space, and for being one of only 12 Americans ever to step on the Moon. He should also be remembered as someone who, even in his final days, never lost sight of the future," Goldin added. "Alan Shepard lived to explore the heavens. On this final journey, we wish him Godspeed."

Named as one of the nation's original seven Mercury astronauts in 1959, Shepard became the first to carry America's banner into space on May 5, 1961, riding a Redstone rocket on a 15-minute suborbital flight that took him and his Freedom 7 Mercury capsule 115 miles in altitude and 302 miles downrange from Cape Canaveral, Florida.

His flight followed by three weeks the launch of Soviet cosmonaut Yuri Gagarin, who on April 12, 1961, became the first human space traveler on a one-orbit flight lasting 108 minutes. Although the flight of Freedom 7 was brief, it nevertheless

Continued on page 4



Join us for

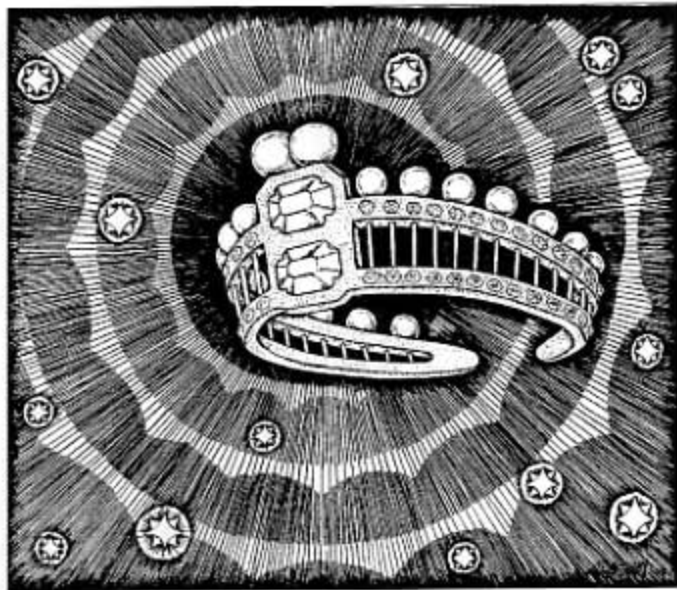
DINNER WITH THE SPEAKER

5:28 p.m., Saturday, 8 August, 1998

PEARL OF SIAM RESTAURANT

5498 College Avenue, Oakland (510) 420-8600

Please call Betty Neall at 510 / 533-2394 by Friday, 7 August to confirm your place. Please be on time to allow ample time for dinner and to facilitate a prompt meeting time of 7:31 p.m.



Ariadne's Crown

The Shawnee Indians tell of a group of star maidens who came secretly down to Earth to perform a mystical dance within a magical circle drawn upon the great prairie. One day by chance a young hunter saw the twelve beautiful girls just as they descended from their celestial chariot. He hid nearby and watched their strange fairy dances, fascinated not only by the grace of the movement, but also by the beauty of the dancers. On the following day the youth, White Hawk, returned to the place and found that so, too, the dancers came again. Intrigued, White Hawk watched the ceremonies day after day as he found himself falling deeply in love with the fairest and youngest of the maidens.

Knowing that the girls would be frightened away should he approach them, White Hawk used his supernatural powers to change his form into that of a field mouse. In that fashion he crept through the long prairie grass until he was right within the magic circle. When his love danced near, White Hawk suddenly resumed his normal form and rose to seize her firmly in his arms. The others fled at once and sped away into the heavens, for the young maiden could not escape the lad's grasp and the rest had no choice.

Star Maiden looked at White Hawk and found him to be a handsome young man, and she returned his love. They were warmly welcomed in his village. The two were married and lived happily for many years. A son was born to them.

Yet after a period Star Maiden experienced a longing for her former home and people. She ran away, taking her little son with her, and journeyed to her land above, to the village of white tents in the sky.

But she was not happy there, for she truly loved White Hawk and could not think of living without him. In council, the chiefs of the star kingdom decided to invite White Hawk to make his home with them in the sky. Star Maiden's son, now grown to be a brave youth, was sent as a messenger to Earth; and he was able

to persuade his father to return with him to star country.

As a token for his new countrymen, White Hawk took with him gifts such as a feather from an eagle, a horn from a bison, a cast-off skin from a rattlesnake. These were accepted with much ceremony and delight, for the sky people had never seen these strange things. For himself and his wife and son, White Hawk took the feathers of a white falcon, and in that guise the three now live not in the land nor in the heavens, but they are free as the wind and can travel to either home.

The dancers no longer come to Earth for their ritual dances, but they can be seen in the sky in the constellation Corona Borealis. There they dance on summer evenings, their circle not fully complete, since Star Maiden is no longer with her sisters.

Many ancient cultures found this pattern in the heavens to suggest a crown, or perhaps a fairy circle. The Pawnee regarded it as their Circle of Chiefs. Another American Indian tribe looked upon these stars as the opening of a cave wherein the Great Bear hibernated all winter. The aboriginal Australians thought it to be a boomerang, while the classical Greek myth makes it the crown of Ariadne, daughter of Minos, King of Crete.

The star maidens of the Shawnee may not always dance as a group, for the individual stars lead separate lives, each traveling in a different direction. They are not linked as a true star cluster. In a hundred thousand years or so, the proper motions of the stars will have scattered them to locations where they won't be able to assemble for their nightly dances.

Corona Borealis is a small but very pretty constellation situated between Boötes and Hercules. In August's 10 P.M. sky it is high overhead in the southwest. Interesting objects in the area include a number of fine double stars, although none of these is a member of the circlet's group of seven (or eight) stars. Eta is a double star with a separation of 1 arcsecond, with components of magnitudes 5.6 and 5.9. Zeta is also a nice double with stars that are greenish white in color and separated

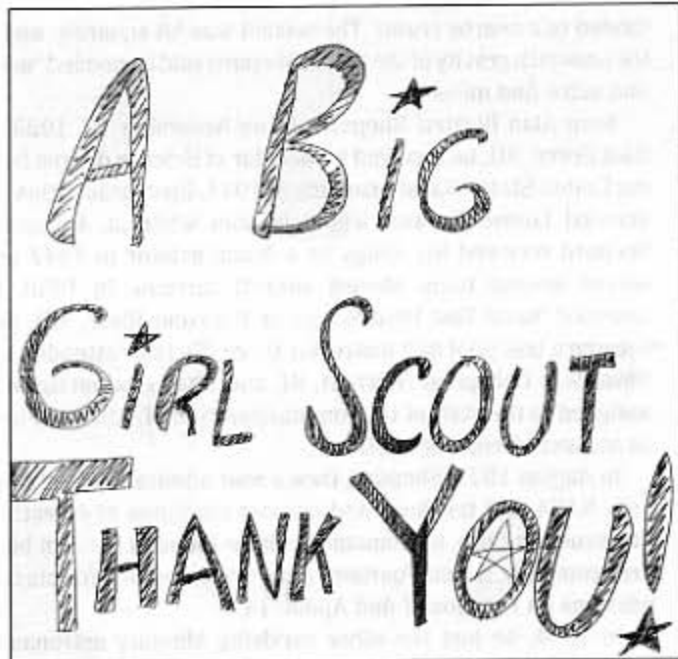
by about 6 arcseconds. Their magnitudes are 5.1 and 6.0.

T CrB is a curious star that has earned the nickname Blaze Star. It is a member of a special group of stars known as recurrent novae. For most of the time it is a ninth magnitude star, but in 1866 it suddenly brightened to second magnitude, then faded so that within a week it was no longer visible to the naked eye. It regained its original brightness over a period of about three months. In 1946 it repeated the cycle, this time achieving magnitude 3. At this frequency, look for it to light up again in the year 2026.

Another variable star, but one that dims rather than brightens, is R CrB, lying within the bowl of the crown. Normally a 6th magnitude star that can be viewed with binoculars, on occasion it drops out of sight to magnitude 12. Unpredictably, it may recover promptly, or it may not return to normal for several years. The best explanation for this behavior involves the ejection of carbon clouds that obscure the light until the soot is swept away or reabsorbed. Stars of this class are supergiants, poor in hydrogen and transmuting their helium to carbon.

Look! how the crowne which
Ariadne wore
Upon her yvory forehead, ...
Being now placed in the firmament,
Through the bright heavens doth her
beams display,
And is unto the starres an ornament,
Which round about her move in order
excellent.

Spenser's Faerie Queene



176 Girls Scouts

and their leaders from Union City and Fremont welcomed the Eastbay Astronomical Society to their Coyote Hills Day Camp at Garin Park in Hayward on Friday evening, July 17, for a star party. Louise Predovic, leader for the EAS Junior Astronomers, and Ellis Myers, *Reflector* editor, were aided by Junior Astronomers Shanina Shumate and Dé Von Morris, in presenting a Starlab program and telescope viewing session for the girls. In return, the Scouts gave commemorative patches and giant thank-you cards signed by all the camp participants. The EAS volunteers also enjoyed delicious barbecued kebobs prepared by the camp, and lots of cookies.

The Chabot Starlab portable planetarium was set up in the barn where groups of about 25 girls at a time learned to find Polaris and to recognize the constellations of the summer sky. Some of the Greek myths and Native American sky tales also were told to the interested youngsters. Outside, using an Astroscan telescope, the girls watched Boy Scouts hiking on the hillside opposite the camp until it became dark enough to look at some double stars.



This photo of the constellation Corona Borealis, the Northern Crown was taken on 9 March 1997 from a dark sky site in Blanford, Massachusetts.

Amateur astrophotographer Joe Roberts used a 135mm f/2.5 Pentax and a K1000 camera loaded with Kodak Royal Gold 1000 film. Exposure duration was 4 minutes.

Comet Comments by Don Machholz

The Lincoln Laboratory Near-Earth Asteroid Research Project has found four more comets. One of them, C/1998 M 5 (Linear), should be visible in our northern skies for the next year. Meanwhile, two more faint comets have been discovered by the Spacewatch program at Kitt Peak, one being visually found on an image-display monitor by J Montani.

The SOHO satellite found nine more comets, most being sungrazers. All disappeared into the solar vicinity. In late June, contact with the SOHO spacecraft was lost during a positioning maneuver. Hope is not lost, technicians are still working on it.

Comet Comments celebrates its 20th year with this, its 240th issue. It all began in August 1978 when I wrote my first regular comet article for the San Jose Astronomical Association Newsletter. At the same time I also wrote an article suggesting a star party in March to find the Messier Objects—our first Messier Marathon. It was only a few weeks later—September 12, 1978—that I discovered my first comet.

Comet Hunting Notes: The Edgar Wilson Award has been announced for amateurs who discover comets. A cash award of about \$20,000 will be distributed each June 12 among those finding comets during the previous year. The rules are few. The comet must be named after you and you must be using your own equipment in an amateur capacity. The discovery may be made by visual, photographic, or electronic means. The amount an individual receives depends upon the number of comet finds during the year. In the past twenty years, an individual would have received between \$1500 and \$20,000 for a comet find.

Date (00UT)	R.A. (2000)	Dec.	Elong.	Sky	Mag.
C/1995 O1 (Hale-Bopp) [Carina]					
08-05	06h54.4m	-54°10'	76°	M	10.8
08-10	06h58.7m	-54°49'	77°	M	10.8
08-15	07h02.8m	-55°30'	77°	M	10.9
08-20	07h06.7m	-56°14'	77°	M	10.9
08-25	07h10.5m	-56°59'	78°	M	11.0
08-30	07h13.9m	-57°46'	78°	M	11.0
C/1997 J2 (Meunier-Dupouy) [Pegasus]					
08-05	21h51.3m	+18°10'	143°	M	11.3
08-10	21h45.6m	+16°21'	147°	M	11.3
08-15	21h39.8m	+14°26'	151°	M	11.3
08-20	21h34.1m	+12°25'	154°	M	11.4
08-25	21h28.7m	+10°21'	156°	M	11.4
08-30	21h23.5m	+08°16'	156°	E	11.4
09-04	21h18.7m	+06°10'	153°	E	11.5
C/1998 M5 (Linear) [Pegasus-Cygnus]					
08-05	22h30.1m	+30°34'	128°	M	11.8
08-10	22h19.9m	+32°19'	130°	M	11.6
08-15	22h08.4m	+33°57'	131°	M	11.5
08-20	21h55.8m	+35°27'	132°	E	11.4
08-25	21h42.3m	+36°46'	132°	E	11.3
08-30	21h28.0m	+37°53'	131°	E	11.3
09-04	21h13.3m	+38°45'	129°	E	11.2



Mission MR-3 lifts off from Cape Canaveral on May 5, 1961, carrying America's first astronaut, Alan Shepard. The Freedom 7 capsule had no window; Alan Shepard could only see outside through a periscope, and the view was in black and white because he had accidentally left a gray filter over the opening. He was able to maneuver the spacecraft slightly during his five minutes of weightlessness, controlling the attitude of the spacecraft with tiny thrusters.

less was a major step forward for the U.S. in a rapidly-accelerating race with the Soviet Union for dominance in the new arena of space.

Buoyed by the overwhelming response to Shepard's flight, which made the astronaut an instant hero and a household name, President John F. Kennedy set the nation on a course to the Moon, declaring before a joint session of Congress just three weeks later, "I believe this nation should commit itself to achieving the goal, before the decade is out, of landing a man on the Moon and returning him safely to the Earth."

Over a three and a half year period from July 1969 to December 1972, a dozen Americans explored the lunar surface. Shepard was the fifth man to walk on the Moon, and the oldest, at the age of 47.

Shepard, however, was almost bypassed for a trip to the moon. He had to overcome an inner ear problem called Meunier's syndrome that grounded him for several years following his initial pioneering flight. An operation eventually cured the problem and Shepard was named to command the Apollo 14 mission. On January 31, 1971, Shepard, Command Module pilot Stuart Roosa and Lunar Module pilot Edgar Mitchell embarked for the Moon atop a Saturn 5 rocket. Shepard and Mitchell landed the lunar module Antares on February 5 in the Fra Mauro highlands while Roosa orbited overhead in the command ship Kitty Hawk. [Editor's note: See obituary for Stuart A. Roosa, *The Refractor*, January 1995.]

Shepard planted his feet on the lunar surface a few hours later, declaring, "Al is on the surface, and it's been a long way, but we're here." During two excursions on the surface totaling nine hours, Shepard and Mitchell set up a science station, collected 92 pounds of rocks and gathered soil samples from the mountainous region. Near the end of the second moonwalk, and just before entering the lunar module for the last time, Shepard (an avid golfer) hit two golf balls with a makeshift club. The first

landed in a nearby crater. The second was hit squarely, and in the one-sixth gravity of the moon, Shepard said it traveled "miles and miles and miles."

Born Alan Bartlett Shepard, Jr. on November 18, 1923, in East Derry, NH, he received a Bachelor of Science degree from the United States Naval Academy in 1944. Upon graduation, he married Louise Brewer, whom he met while at Annapolis. Shepard received his wings as a Naval aviator in 1947 and served several tours aboard aircraft carriers. In 1950, he attended Naval Test Pilot School at Patuxent River, MD, and became a test pilot and instructor there. He later attended the Naval War College at Newport, RI, and after graduating, was assigned to the staff of the commander-in-chief, Atlantic Fleet, as an aircraft readiness officer.

In August 1974, Shepard, then a rear admiral, retired from both NASA and the Navy and became chairman of Marathon Construction Corp. in Houston. He later founded his own business company, Seven Fourteen Enterprises, named for his two missions on Freedom 7 and Apollo 14.

In 1984, he and the other surviving Mercury astronauts, along with Betty Grissom, the widow of astronaut Virgil I. (Gus) Grissom, founded the Mercury Seven Foundation to raise money for scholarships for science and engineering students in college. In 1995, the organization was renamed the Astronaut Scholarship Foundation. Shepard was elected president and chairman of the foundation, posts he held until October 1997, when he turned over both positions to former astronaut James A. Lovell.

Alan Shepard leaves his widow, Louise, daughters Julie, Laura and Alice and six grandchildren. The family has suggested that donations may be made to the Astronaut Scholarship Foundation, 6225 Vectorspace Boulevard, Titusville, FL 32780.

Shepard's death leaves only four survivors among the original Mercury 7 astronauts: Senator John Glenn, Scott Carpenter, L. Gordon Cooper and Walter Schirra. Gus Grissom (who died along with Edward H. White and Roger B. Chaffee on January 27, 1965, in the tragic fire prior to the first Apollo mission) and Donald (Deke) Slayton were the other members of the first astronaut class.

Eastbay Astronomical Society

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Articles and photos for *The Refractor* are encouraged. Deadline for the September issue is August 26, 1998. Items may be submitted by mail to the editor, Ellis Myers, 215 Calle La Mesa, Moraga, CA 94556. Internet e-mail address: eas@silcon.com. For further information please call (925) 284-4103.

Internet: <http://silcon.com/~eas> • <http://chabot.cosc.org/~eas>

Roberts Rules

By Carter Roberts

Again it is time to ask for more active participation from the members of EAS toward the goals expressed in the mission statement of our group. This month marks the annual star party we host for the East Bay Regional Park District. This event, to be held at Bort Meadows on Wednesday, August 26, brings an awareness of the sky's wonders to a large number of young people. It will give you an opportunity to share with them your knowledge of the summer constellations and other basic facts of our world and beyond. You are sure to enjoy the evening, whether you are a novice or a full professor. Bring your children and their friends, too. Please let one of the Board members know that you'll be there. Plan to arrive by 7 P.M. so as to be set up by nightfall; plan to stay until about eleven.

Behind-the-scenes tasks are in need of care by new people to smooth out the seemingly endless work of keeping our organization on course. If you are able to spend some time on our behalf, your help will be well appreciated, if not well paid! Whatever your interests and abilities, I think we can find a place for you.

There has been much concern in recent weeks—as well as much rumor—about the near future of the public programs and the gift shop at Chabot. Indeed, there is cause for concern: yet nothing is written in stone. The latest word is carried in the following resolution adopted by the COSC Program Committee at their meeting on July 22:

"Public Programming: The staff should be directed to maintain public programs, including Gift Shop, at the present level through the use of increased numbers of EAS and other qualified Volunteer-Docents. This action is justified by the use of the true attendance figures of the planetarium, disclosure of true costs of operation including the gift shop, the improvement in planetarium programs, the restoration of the popular experimental demonstrations, the meeting of the Volunteer-Docent Task Force, the full use of volunteer/docents wherever possible, setting a goal of 4 planetarium shows per week with ≥ 70 public guests per show (77.8% of capacity), setting a reasonable operations budget to cover minimal labor and operational expenses, and the regular reporting out of progress on all of these matters to both the Executive Committee and the full Board until opening."

It might be well that each EAS member make known to COSC your concern that the public programs, including the gift shop, are the essence of COSC's value to the community, and that anything that lessens the presence of these programs lessens the efficacy of the COSC's mission, which is stated "to provide a full range of programs and activities for individuals and groups of all ages to experience the process—and excitement—of scientific discovery."

The accompanying photo, taken on July 2, is evidence that the new building is cast in concrete. Now, after a month, construction has further proceeded. Come see what's going on. See the article on this page inviting you to the Family Picnic on August 7.

Another event that's sure to be worth your while is the annual Star-B-Que at Fremont Peak on August 22. You'll find notice of this affair elsewhere in this newsletter.

Chabot Observatory

Family Picnic • August 7



The Board of Directors and Staff of the Chabot Observatory & Science Center cordially invite their members and families to attend **The First Faces of the Moon** at the site of the new facilities which are now under construction off Skyline Boulevard, Oakland, in Joaquin Miller Park, near the Archery Range.

There will be fun and games for the kids, telescope viewing of the Moon, kids crafts, mini-tours of the construction site, prizes, the COSC Starlab portable planetarium, and much more!

Although you may pay at the picnic for your dinner box—\$5 for adults, \$3 for kids—space is limited, so please make your reservations early by calling (510) 864-4208. This first gathering at the new Chabot Observatory & Science Center will be on Friday evening, August 7, from 6:00 P.M. until 9:30 P.M.



Mark your calendars and make your reservations for the Planet Watch Workshop, which is described in the enclosed flyer. This will be a unique opportunity to participate in an interchange with top-flight authorities on observing the solar system. We expect to have more details for you in next month's *Refractor*, but don't wait for that, because enrolment is strictly limited.

As announced in the June issue of the *Refractor*, COSC has joined with the Smithsonian Institution as an affiliate. This will enable the display in the East Bay of priceless collections, and will enable the Smithsonian to add to its presence across the nation.

COSC is discussing several areas and collections at this time. First is the area of antique telescopes and related instruments. The Smithsonian Institution has become the home to many significant instruments, such as the 24-inch George Richey reflector at the National Museum of American History.

Meteorites will also be featured here. The Smithsonian has one of the richest collections in the world. Chabot staff will work with Smithsonian staff to create an exhibit that will tell the story of the solar system and meteoritics.

The central focus for a grand opening at COSC will be titled Hologlobe, in which a 1-meter diameter hologram of the Earth will be projected to the viewing audience. This high-tech presentation will illustrate plate tectonics, climate trends, and other global features.

DATELINE AUGUST

- 11 1877 Mars satellite Deimos discovered, Asaph Hall
17 1877 Mars satellite Phobos discovered, Asaph Hall
5 1930 Neil Armstrong, born Wapakoneta, Ohio
27 1962 Mariner 2 launched
20 1977 Voyager 2 launched
- 7 1998 Full Moon, 19:11 PDT - 02:11 UT 8 August
Minimal penumbral lunar eclipse
- 12 1998 Perseid meteors peak
- 14 1998 Last Quarter Moon, 12:50 PDT = 19:50 UT
- 21 1998 New Moon, 19:03 PDT - 02:03 UT 22 August
- 29 1998 First Quarter Moon, 22:07 PDT
= 05:07 UT 30 August

You are invited to make your own telescope at the
TELESCOPE MAKERS WORKSHOP

Join our group each Friday evening at
Chabot Observatory

Call Paul Zurakowski for more details
(925) 447-6837

FUTURE CONJUNCTIONS

August

- 7 6:00 P.M. COSC Family Picnic
8 7:31 P.M. EAS lecture meeting, TBA
13 7:30 P.M. EAS Board meeting
22 Star-B-Que at Fremont Peak
26 7-11 P.M. Star Party at Bort Meadows

September

- 10 7:30 P.M. EAS Board meeting
12 7:31 P.M. EAS lecture meeting.
Alan Binder, Lunar Prospector
18-19 Nightfall, Borrego Springs
Riverside Astronomical Society
25-26 Planet Watch Workshop, Chabot

✓ Check our our Web Sites at:

<http://silcon.com/~eas>

<http://chabot.cosc.org/~eas>

- ✓ The latest copy of *The Refractor* with images in color.
- ✓ Information about the **Eastbay Astronomical Society**
- ✓ Great astrophotographs by **EAS** members.

If you have photos you would like to have displayed on our Web page, please submit a .gif file, .jpg file or a color print to the editor, Ellis Myers. Phone (925) 284-4103. We would be happy to include your work.

Eastbay  **Astronomical Society**

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