



# The Refractor

The Bulletin of the Eastbay Astronomical Society

Founded in 1924 at Chabot Observatory, Oakland, California

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## Return to the Red Planet

NASA has selected an ancient flood plain on Mars as the landing site for Mars Pathfinder, which was to have arrived on July 4. Publication schedule for the *Refractor* does not allow us to report the success of this mission to date, so we have chosen to present only a description of the mission target location.

Eons ago, when water flowed on Mars, great floods inundated the rocky plain in an area known as Ares Vallis. The site is 850 kilometers (530 miles) southeast of where Viking Lander 1 became the first spacecraft to land on Mars, in 1976. It is at the mouth of an ancient outflow channel chosen for the variety of soil samples it may present. The center of the 100x200-km (60x120-mi) landing ellipse pictured above is at 19.5°N, 32.8°W.

The lander, carrying the Sojourner microrover, will aerobrake in the upper Martian atmosphere using an aeroshell and a parachute. Just before impact, airbags will inflate to cushion the landing. The microrover will then roll out to examine the rocks and soil nearby. Both lander and rover will carry scientific instruments and cameras. The lander will make atmospheric and meteorological observations during descent and function as a weather station on the surface, as well as a radio relay station for the rover. Since the spacecraft are solar-powered, the best site is one with maximum sunshine and in July, 1997, the sun will be directly over the 15 degrees north latitude region of the planet. The elevation must be as low as possible so the descent parachute has sufficient time to open and slow the lander to the correct terminal velocity.

The Ares Vallis site is a "grab bag" location, where a wide variety of rocks are potentially within the reach of the rover. Even though the exact origins of the samples would not be

## Members Meeting at the EAS

Saturday, 12 July

Potluck 5:28 p.m., Physics Lab

Presentations 7:31 p.m., Observatory

Chabot Observatory

4917 Mountain Boulevard, Oakland

Once again, on Saturday, July 12, the Eastbay Astronomical Society will be having Members' Night. Bring your videos, slides of Hale-Bopp and other sky wonders, pictures, funny stories, and whatever else you can think of to entertain, edify, surprise, and stun your fellow amateur astronomers. Featured will be pictures taken at the legendary (some would say notorious) Fourth of July Barcroft Star Party at 12,400 feet in the White Mountains. See what your friends and colleagues can do in the dark, in the cold, with little if any oxygen! See what bizarre rituals and garb we put on in the middle of the night. See how big and beautiful the Milky Way really is! See the Veil Nebula as if it were a David Malin photo.

In addition, John Westfall will show us his pictures of a relatively new meteor crater recently discovered in Nevada. There will be other surprises from members. All members will be restricted to 15 minutes for their presentations. Please call Dave Rodrigues at 510-483-9191 or Carter Roberts at 510-524-2146 to reserve a place in the program. Come and participate—you're the star of our show!

To set a convivial mood, we will get together before the meeting for food and friendship at our ever popular potluck, starting precisely at 5:28 p.m. Bring your favorite appetizer, salad, entrée, or dessert, enough for at least one person if that were all one ate. The club will provide plates and utensils, as well as coffee, for the meal; and there will be a refreshment break midway through the evening's program.

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known, the chance of sampling a variety of rocks in a small area can reveal a lot about Mars. The rocks would have been washed down from highlands at a time when floods moved over the surface of Mars.

Both the Pathfinder lander and rover have stereo imaging systems. The rover also carries an alpha proton x-ray spectrometer to examine the composition of rocks. The imaging system will reveal the mineralogy of surface materials as well as the geologic processes and surface-atmosphere interactions that modified the surface. It will also enable study of dust particle size and water vapor abundance in the atmosphere. casa



## Te Ika A Maui

"Now many are the tales told of Maui for he it was who slowed the Sun, in the days when it would race across the sky; and he it was who gained the secret of fire from Mahuika. But the story which I shall tell is of how Maui tikitiki a Taranga, Maui the last born, fished up this Island, the North Island of New Zealand.

"Now often the brothers of Maui would go fishing, and due to their distrust and jealousy of their younger brother they would leave him behind. But Maui Potiki was cunning and in the night he hid himself beneath the boards of their Waka and the next morning when they went out he remained below. The brothers went to their fishing grounds, but Maui had already ensured that the fish would not be there, and so the brothers went further and further out into the ocean. Finally when far from the land Maui emerged from his hiding place. His brothers, angry and surprised, talked about returning to land, but Maui scorned them saying "what use is that, we are so far from land now, that it would take too long to return". The brothers cast their lines, but to Maui they would give no bait, and so Maui the Trickster smote his own nose, so it would bleed; this he smeared upon a miraculous jawbone given him by his grandmother Murirangiwhenua, and this he cast into the sea. Down went this enchanted fish hook, Te Matau a Maui, down into the very deepest depths of the ocean.

"Something had the line and Maui Nukuhanga, heaved. With all his might he heaved; with straining muscles and sweating brow he pulled; with clenching teeth and rolling eyes he dragged his fish up from the sea. Finally, Te Ika a Maui, the Fish of Maui, rose up and lay out smooth upon the surface of the sea. As Maui returned to land to give thanks for his catch, his brothers in their greed attacked the Ika a Maui, and chopped into its sweet tender flesh. The creature thrashed and writhed in its pain, and herein turned to stone. That is why Te Ika a Maui, the North Island of New Zealand, is a rugged land of high mountains and deep valleys. If not for Maui's brothers this land would be smooth as the back of a stingray.

"When Maui realized that he had brought up the island, he was so delighted that he tossed his fish hook far up into the

heavens, where it caught and hung, outlined with bright stars." And so goes the Maori story of the creation of the Fish Hook of Maui, the star group we know as Scorpius.

According to a legend of the people of the Marshall Islands, the mother of all stars (Capella in Auriga) proposed a canoe race to a nearby island. She asked each of her sons to allow her to ride with her possessions in their canoes; all thought this would slow their craft and they would lose the race. All, that is, except the youngest (represented by the Pleiades), who gladly allowed his mother to ride with him. Among the possessions she had brought onboard were sails and rigging, and with this to help them their canoe easily pulled ahead. Her eldest son (Antares in Scorpius), frustrated and angry, demanded the canoe and equipment, but his mother would not agree. The eldest son had to fasten the sail to his shoulders, causing his bent back that now accounts for the shape of Scorpius. He was so enraged that his younger brother won the race and became king of the stars that he never wanted to see his brother again. That is why the Pleiades and Antares are always separated in the sky, Antares setting in the west as the Pleiades rise in the east.

That story is completely different yet remarkably similar to the classic Greek story of the separation of Scorpius from Orion in the sky. You will remember that Orion, representing light and the Sun, was stung by the scorpion, the contemptible insect of darkness and symbol of death. Ancient Egypt, too, kept the similar idea of opposition between evil forces and good, and when the Sun entered Scorpius it marked the reign of the god Set, personification of evil, and the mourning of the beloved Osiris, brother of Set.

Scorpius occupies a rich and wonderful area of the Zodiac, although the modern boundaries of the constellation are host to the Sun for only nine days of the year. The Sun resides in Ophiuchus, the forgotten zodiacal constellation, for twice that time. The greater part of the scorpion lies south of the ecliptic, with Graffias,  $\beta$ -Scorpii, the only bright star to the north. This star is an interesting multiple star which is occulted by the Moon on occasion. With its principal component at magnitude 2.6, there are companions of magnitudes 4.9 and 10.3, and

*Continued on page 3*

### Eastbay Astronomical Society

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Articles and photos for *The Refractor* are encouraged. Deadline for the August issue is July 23, 1997. Items may be submitted by mail to the editor, Ellis Myers, 215 Calle La Mesa, Moraga, CA 94556. Internet e-mail address: emyers@a.crl.com. For further information please call (510) 284-4103.

Internet: <http://chabot.cosc.org/EAS> or <http://home.earthlink.net/~jpreston/eas/>



there are lesser stars in this system, as well. The giant red star Antares, rival of Mars, is also a double star, with a faint bluish star circling it close by which was discovered in 1819 during an occultation by the Moon.

The two star clusters so magnificently captured in Conrad Jung's accompanying photo are naked-eye objects, although viewing with binoculars or a small telescope will give a really spectacular sight. M6, at the top of the photo, is called the Butterfly Cluster. M7, 3.5 degrees to the southeast (toward the bottom in the photo), is larger, with a diameter more than that of the full Moon. It contains about 80 member stars brighter than tenth magnitude; they are about 800 light years distant, while the stars of M6 are about twice that far away.

Three other Messier objects are within the realm of Scorpius. They are M4, M62 and M80, all globular clusters. Other clusters and diffuse and planetary nebulas make Scorpius an important and satisfying destination for observers and particularly for astrophotographers.

## The AANC Annual Awards

for 1997 have been selected and will be presented on August 2 at the Star-B-Que, which is hosted by the Astronomical Association of Northern California in cooperation with the Fremont Peak Observatory Association. The *Reflector* will give further details next issue. Recipients are Chuck Vaughn of Tri-Valley Stargazers in the Amateur category, and Dr. David Morrison of NASA/Ames in the Professional category. Steve Kufeld of Telrad will be honored with the Commercial award, while a special award will be given to Nancy Kassover, of the Happy Valley School in Lafayette.

## Roberts Rules

By Carter Roberts

Summer is with us again, and with it a great time for us all to view the skies without freezing. I want to point out a couple of good opportunities for you to appreciate the good weather and good fellowship. First is the monthly meeting on July 10, where the potluck dinner will be a fine time to chat with the rest of us while comparing our culinary skills. We've set the schedule for the usual meeting-night dinner time of 5:28 p.m., which will allow everyone to be finished in time for the new, guaranteed (!), meeting time of 19:31. I'll explain this choice of starting time when we do meet that evening. If you have questions about what you might bring to the potluck, call Dave Rodrigues at 483-9191.

Presentations by members of their observations and experiences usually extends beyond the customary closing time, but whatever the extent, there will be the chance to view through the Chabot telescopes until the operators kick you out.

The **Star-B-Que** picnic-cum-star party at Fremont Peak with the Fremont Peak Observatory Association on August 2 is not to be missed. You don't need to bring a telescope—there'll be a host of optics waiting to be shown off to you and your friends.

Now an annual event many of us look forward to, the **Bort Meadows Star Party** with the **East Bay Regional Park District** on Thursday evening, August 7 is where we can make a real contribution to our community. Please plan to be with us this year. Whether you have a telescope you can bring, or if you do not, you can add to the enjoyment of yourself and others as we show and tell about the constellations and planets for the benefit and pleasure of the youngsters of our area. Plan to arrive by about 7:30 to set up before dark, and let Dave Rodrigues know you'll be coming, if you will. Bort Meadows is in Chabot Regional Park, off Redwood Road 4.4 miles east of Skyline Boulevard.

COSC has prepared a four-page, full-color portfolio of photographs of Comet Hale-Bopp taken by staff and volunteers, including Executive Director Dr. Mike Reynolds, Conrad Jung, Axel Mellinger, and myself. These spectacular images are available in the Starry Nights Gift Shop for \$1.50, or by mail for \$3.00. Also available are postcards showing the "Comet of the Century" over Chabot. Incidentally, for a limited time the portfolios are being given to new and renewing members of COSC. To become a member—and all EAS members really are encouraged to do so—simply call Wayne Mitchell at 510/530-3480 x20 with your information and your credit card handy.

On behalf of myself and the members of EAS, I want to thank Don Stone, who, in addition to his responsibilities as Treasurer, keeps so many of the unending, underappreciated tasks under control. Taking the printed and addressed copies of the *Reflector* to the Post Office is one such. Let these otherwise thankless jobs Don does cheerfully no longer be thankless.

You may have heard that EAS member Al Stern was injured in a misfortune in New Hampshire when his car struck a moose at freeway speed. (The moose was moving more slowly than that, actually.) The "jaws-of-life" were needed to extract Al from the car, which was crushed by the weight of the animal. Al is now home in San Francisco, recovering from head injuries. Al's helpfulness has been an appreciated asset at the Observatory.



## The Antique Telescope Society

an international society of collectors, researchers, students, museums and librarians with an interest in the history of the telescope and related astronomy, will host its sixth annual convention in Southern California, September 12-15, 1997. Venues include: Mt. Wilson Observatory, Griffith Observatory, Hale's Solar Lab, Caltech & Palomar Observatory. Open to members and guests of the society, you do **not** have to join the Society to attend (although it is more economical to do so). In the past, ATS conventions have been first class gatherings in such places as Bath, England, Washington (USN Observatory), Yerkes, Lick, Ricard, Sproul, Chabot Observatories and others.

*Will we get to use any of the large historic instruments?* - Yes, we have time reserved on the 60" reflector at Mt. Wilson.

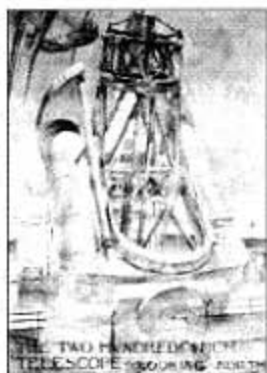
*What do we do at these conventions?* - See great observatories and telescopes with significant historical records ... Hear great presentations about telescopes, telescope makers, observatories, and related topics ... Eat good food ... See members' collectible telescopes ... Observe with large, historic instruments ... Get the "insider's" tour of historic sites (you will see what the general public rarely sees) ... Make acquaintances from all over the country and other countries as well.

*What does it cost?* - Prices haven't been set, but in every past convention, the perception of the members is that the value of the convention far exceeded the cost. In all cases, the ATS tries to do things in a first class manner and it has shown in the increased attendance and growth of the society.

*How do I sign up?* - E-mail Bart Fried at [nvista@compuserve.com](mailto:nvista@compuserve.com) for further information. As the convention gets closer, details will be finalized and a packet will be available for anyone who wishes to consider attending.

**Program: Mt. Wilson Convention - September 1997**  
**Friday 12th:** Registration at the Holiday Inn, 303 E. Cordova Street, Pasadena, CA 91101. Reservations Toll-free 1-800-457-7940 • Reception. • Dinner. • Keynote Speaker.  
**Saturday 13th:** Docent-led tours of the Mount Wilson Observatory complex. • Lunch. • Paper Sessions. • Buffet Dinner. • Guest Lecture. • Observing with the 60" Ritchey reflector.  
**Sunday 14th:** A.T.S. Business Meeting (Annual General Meeting for Members only). • Paper Session. • Lunch. • Paper Session. • Visit the Hale Solar Laboratory, where we will see Hale's original setup and have a small reception and then a visit to Caltech to see the collection of original Porter drawings of the 200" etc. • Informal dining at local restaurants. • See the Planetarium show at Griffith Observatory and visit the Zeiss 12" Refractor.

**Monday 15th: \*\*Special Tour of the 200" Hale telescope at Palomar Observatory\*\*** We will have a private tour inside the building, usually off limits to visitors.



Russell Porter's 1938 drawing of the Palomar 200-inch Hale Telescope.

## José's Observations

by José Olivarez

As Chabot Observatory and Science Center's Director of Astronomy, I will be keeping the EAS membership informed on current and future astronomy programs at Chabot Observatory via this column and through COSC's "Science Center News". But as the title of this column suggests, I will not only be giving you my observations on COSC astronomy programming, but also on astronomical observations made through Chabot Observatory telescopes. I have seen some wonderful views of the Moon and Mars through the 20-inch refractor in the past weeks and am hoping to have exciting observations of Jupiter to report this Fall!

The Rotary-Chabot Planetarium Program Schedule has now been set for the rest of the year! The Shows are presented on Fridays and Saturdays at 7:30 p.m. The titles, show dates, and descriptions follow:

*"When The Sky Falls: Meteors, Meteor Showers, and Meteorites"* Now Showing through July 26th.

*"An Evening On Mars"* August 1-September 27

This subject was chosen because the landing of Pathfinder on Mars has made us "martians" again! This show consists of a descriptive lecture/demo about the physical nature of Mars and describes the Pathfinder and Global Mars Surveyor missions.

*"Our Place In The Universe"* October 3-November 22

Chabot Observatory's "Astronomy for Adults" students recently have been awed by the "our place in the universe" sequence in the class; so we decided to "go public" with it! This is a "zoom" discovery tour of the Universe in seven steps tracing our "cosmic address" which, by the way, is approved by the National Geographic Society!

*"The Star Of Bethlehem"* December 6-31

This show is a new production of the popular "Christmas Star" show that is done in planetariums at the Christmas season throughout the country. This production is by José Olivarez.


Don't forget to visit the Starry Nights Gift Shop at the Observatory. A new offering there is used and almost-new astronomy books for sale at bargain prices. These are one-of-a-kind books from my personal collection, and when they are gone...

## An Open Letter...

Can anyone describe an experiment to distinguish between the two possibilities: (1) the space between two galaxies is expanding; and (2) the two galaxies are moving away from each other?

If no one can describe a distinguishing experiment, then it is nonsense to write articles distinguishing between galaxies moving apart and space expanding.

Respectfully,



Lewis Epstein

## Comet Comments *by Don Machholz*

Comet Hale-Bopp and Periodic Comet Encke are not far apart in the southern sky. They are visible mainly to those in the equatorial areas and south of the equator.

As observers turned their instruments to observe Comet C/1997 J1 (Mueller), they also picked up a new comet—unrelated, but slightly brighter. It is now known as Comet C/1997 J2 (Meunier-Dupouy). This large comet will be closest to the Sun next March at 3.05 AU when it should reach magnitude 10.

Meanwhile, a solar-orbiting satellite named SOHO has picked up ten new faint comets over the past year. All were imaged only by the satellite as they zoomed in toward the Sun. Most seem to be following the same orbit as the Kreutz Sungrazing comets, disappearing as they rounded the Sun. They were magnitude 2 to 8, with most at magnitude 7-8.

**Comet Hunting Notes:** Of the 97 visual comet discovery events since January 1, 1975—during which 73 comets were found and named—only four times was the comet found by accident. In early July, 1975, Doug Berger and the late Dennis Milon found a comet while observing M2. It had been found the previous day by a comet hunter, Toru Kobayashi of Japan. Then, twenty years later Alan Hale and Thomas Bopp chanced upon a new comet near M70.

Date (00UT)	R.A. (2000)	Dec.	Elong.	Sky	Mag.
C/1995 O1 (Hale-Bopp)	[Monoceros-Canis Major-Puppis]				
06-26	06h34.0m	+00°14'	23°	E	3.4
07-01	06h41.3m	-01°37'	25°	M	3.6
07-06	06h54.6m	-03°27'	26°	M	3.8
07-11	06h54.6m	-05°16'	28°	M	3.9
07-16	07h01.0m	-07°05'	30°	M	4.1
07-21	07h07.1m	-08°55'	32°	M	4.3
07-26	07h13.0m	-10°45'	35°	M	4.4
07-31	07h18.8m	-12°36'	37°	M	4.6
08-05	07h24.3m	-14°28'	39°	M	4.7
2P/Encke [Monoceros-Canis Major--Scorpius]					
06-26	07h09.0m	-17°27'	43°	E	6.1
07-01	07h48.7m	-36°06'	61°	E	6.0
07-06	09h22.3m	-57°51'	86°	E	6.3
07-11	12h46.0m	-67°39'	107°	E	6.9
07-16	15h18.5m	-61°58'	120°	E	7.7
07-21	16h20.2m	-54°40'	126°	E	8.5
07-26	16h50.5m	-49°07'	129°	E	9.2
07-31	17h09.0m	-45°02'	129°	E	9.8
08-05	17h22.2m	-41°58'	127°	E	10.4

Object	Hale-Bopp	P/Encke
Peri. Date (1997):	04 01.13800	05 23.59776
Peri. Dist (AU):	0.9141405	0.3313951
Arg/Peri (2000):	130.58915°	186.27201°
Asc. Node (2000):	282.47069°	334.72147°
Inclin. (2000):	089.42943°	011.92956°
Eccentricity:	0.9951172	0.8500135
Orbital Period:	-2500 years	3.28 years

### For Sale: Celestron 8" with Meade Guide Control

This telescope has recently been used for site testing at the new Chabot Observatory & Science Center site...\$650  
Ellis Myers • 510/284-4103

# Observe Eclipses



Michael D. Reynolds  
Richard A. Sweetsir

## Observe Eclipses

is a book that will bring the What, Where, When and Why of both solar and lunar eclipses out of the shadows for you. And now is the time for you to begin planning for your next opportunity to observe and photograph an upcoming eclipse. Whether it will be the solar eclipse on February 26, 1998, in the Caribbean or Venezuela; or the lunar eclipse on September 16 for Africa, Asia and Western Australia, or perhaps it will be an interim partial eclipse, you will have more than 90 pages full of information on every conceivable topic related to the enjoyment of experiencing an eclipse.

Written by COSC Executive Director Dr. Michael D. Reynolds and the late Richard A. Sweetsir, the second edition of *Observe Eclipses* is a complete rewrite from the popular 1979 original publication. Eighteen chapters and eleven appendices surround a grouping of fifteen beautiful color photographs of recent eclipses. The suggested retail price for this valuable guide is \$10, but copies are available in the Starry Nights Gift Shop for just \$5.99.

The book is published by the Astronomical League as one of its "Observe" series.

Gareth Thomson, a member of the Central Oregon Astronomical Society, reports the recent theft of astronomical equipment and requests that people be on watch for this property at swap meets or elsewhere. Included were Fujinon 16x70 and Orion 10x50 binoculars, and a blue Rubbermaid tool case with miscellaneous filters, etc. Notify Sacramento Police at 916/264-5771 with reference to #97-39263.

## DATELINE JULY

- 4 1054 Chinese record supernova, precursor to Crab Nebula
- 6 1687 Isaac Newton published Principia
- 18 1921 John Glenn, born Cambridge, Ohio
- 20 1969 First Moon landing, Apollo 11, Neil Armstrong and Edwin Aldrin, with Michael Collins
- 20 1976 Viking 1 landed on Mars
- 4 1997 New Moon, 11:41 PDT - 18:41 UT
- 12 1997 First Quarter Moon, 14:44 PDT - 21:44 UT
- 19 1997 Full Moon, 20:22 PDT - 03:22 UT 20 July
- 26 1997 Last Quarter Moon, 11:30 PDT - 18:30 UT

✓ **Check our our Web Site at:**  
<http://chabot.cosc.org/EAS>

You'll find:

- ✓ 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 *Refractor* editor, Ellis Myers. Phone (510) 284-4103. We would be happy to include your work.

## FUTURE CONJUGATIONS

- 3-7 July. Legendary White Mountains trip.
- 10 July. EAS Board meeting, 7:30 p.m.
- 12 July. EAS Members meeting and potluck
- 2 August. Star-B-Que. Fremont Peak.
- 7 August. EAS/EBRPD Star Party. Bort Meadows
- 9 August. EAS meeting. To be announced.
- 14 August. EAS Board meeting.
- 30-31 August. Public Program. Fremont Peak. Join Dave Rodrigues and Carter Roberts.
- 13 September. EAS meeting. Ken Crowell. Planet Quest: The Epic Discovery of Alien Solar Systems.
- 26-27 September. Nightfall. Borrego Springs. Sponsored by RTMC
- 24-25 October. Yucca Valley Astro-Festival.

## Rotary-Chabot Planetarium Shows

Fridays and Saturdays, 7:30 p.m.

For information and show schedule, call (510) 530-5225.

**When the Sky Falls** through July 26



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