



The Refractor

The Bulletin of the Eastbay Astronomical Society

Founded in 1924 at Chabot Observatory, Oakland, California

Volume 73
Number 12
August 1997

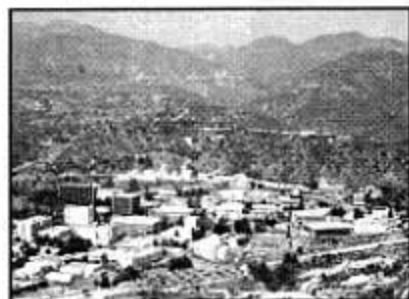
Behind the Scenes at JPL: Pathfinder, Galileo, and Cassini

Saturday, 9 August, 7:31 p.m.

Chabot Observatory
4917 Mountain Boulevard, Oakland

David Rodrigues

What's going on at JPL? What's happening behind the scenes? What's the latest on Mars Pathfinder? Eastbay Astronomical Society Program Director Dave Rodrigues reports as follows:



It was my privilege recently to visit the Jet Propulsion Laboratory in Pasadena during the recent excitement following the Mars Pathfinder landing, the Europa Ocean discovery, and the upcoming Cassini launch to Sat-

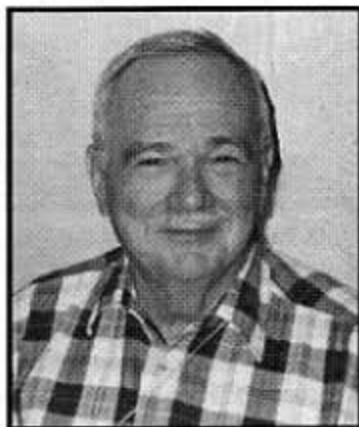
urn in October. Thanks to Dr. Chris McKay, I was able to get into JPL on Monday and Tuesday, July 21-22. I was able to visit various acquaintances in the Galileo, Cassini, and Pathfinder offices. At the Galileo Office of Public Outreach I obtained some slides of the ice covering the ocean of Europa, Jupiter's moon, that are not generally available to the public. I will show these slides at the meeting. What is neat about these slides is that they compare the images of the icebergs on Europa with similarly sized satellite images of the San Francisco Bay Area and at the same resolution. I will also show some beautiful slides of artists' interpretations of the Cassini mission to Saturn that haven't yet been published.

Two other wonderful features of JPL are the gift shop and the Teaching Resource Center. The gift shop has a fantastic selec-

Continued on page 4

A Tribute to Eugene Shoemaker

Members of the EAS were privileged, in December 1994, to count among their guest speakers the renowned Dr. Eugene Shoemaker, Research Professor of Astronomy at Northern Arizona University and staff member of the Lowell Ob-



servatory. Dr. Shoemaker died instantly on the afternoon of July 18, when his car collided head-on with another vehicle on an unpaved road in the Tanami Desert northwest of Alice Springs, in the Northern Territory of Australia. His wife, Carolyn, received serious injuries in the accident, but is reported now to be out of the hospital and staying with friends in Australia.

Geologist Dr. Eugene Merle Shoemaker was born in Los Angeles April 28, 1928. He received his BS degree from California Institute of Technology. His doctoral dissertation at Princeton University, in 1960, was on the structure of Meteor Crater in Arizona. His studies on the mechanics of meteorite impact kept unfolding and opening into beautiful and surprising implications about the Earth, the dynamics of the solar system and its history, and the effects of impacts on the evolution of life.

Gene Shoemaker played an enormous role in the exploration of the Moon. He established a lunar geological time scale and developed methods of geological mapping of the Moon as early as 1960. He created the Branch of Astrogeology of the USGS which led the field geology teams for the Apollo missions; and he was the team leader for Apollo 11. In his early career he dreamed of being the first geologist to map the Moon. His continued studies of the role of impact were critical in our understanding of catastrophic collisions with the Earth, among which are those collisions which terminated the dinosaurs at the Cretaceous/Tertiary boundary. One almost suspects that his discovery of Comet Shoemaker-Levy 9 was just an experiment of Gene's to explore this field to the maximum.

The acknowledged founder of modern planetary geology, Gene received recognition with numerous honors from the Department of the Interior, NASA, and many professional societies. President George Bush presented Gene with the

Continued on page 3

Join us for

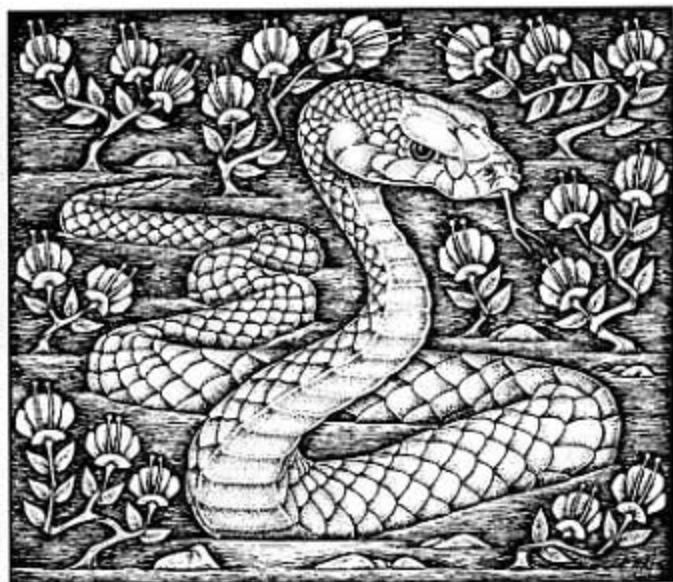
DINNER WITH THE SPEAKER

5:28 p.m., Saturday, 9 August, 1997

PEARL OF SIAM RESTAURANT

5498 College Avenue, Oakland (510) 420-8600

Please call Betty Neall at 510 / 533-2394 by Friday, 8 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.



Job 26:13. By His Spirit He Hath Garnished the Heavens; His Hand Hath Formed

The Crooked Serpent

From the Biblical times of the Old Testament and long before, the stars have included an "Image of the Serpent." Such a sky pattern was known to the inhabitants of the land of the Euphrates by the name *nu-tsir-da*.

The stars that comprise the constellation Serpens originally depicted the reptile in the hand of Ophiuchus, the snake-holder. Ultimately, as the mythology of the Arabs and Greeks blended into a mixture of both cultures, the patterns split into the separate entities, with the serpent being additionally split into the head, Serpens Caput, and the tail, Serpens Cauda. However, the two parts of this image are but one in the list of 88 recognized constellations today.

Ancient stories of monsters dealt with only one sort that was of benefit to mankind. These were the Centaurs. Chiron, for example, was skilled in the arts of medicine, music, and the art of prophecy, as well as in archery and hunting. Jupiter placed this wisest of all the Centaurs into the heavens as Sagittarius after his death. Aesculapius, son of Apollo and the Thessalian princess Coronis, was entrusted, on his mother's early death, to the care and training of Chiron. The child once found a snake in the house of a playmate and killed it; but then observed another snake glide into the room carrying an herb which restored life to its mate. Aesculapius seized the herb and learned its use in the healing powers. The lad grew up to be a renowned physician, capable even of restoring the dead to life. Pluto, god of the lower world and brother of Jupiter, felt threatened by this talent and convinced Jupiter to strike the doctor dead with a thunderbolt. Later, Jupiter recanted and placed the martyr in the sky, together with his serpent, as Ophiuchus, the serpent holder.

So, it can be considered that the stars of Serpens may represent one of the two snakes that symbolize medicine and healing and appear on the caduceus, winged staff of the medical profession. Greek tradition claims that Hippocrates, the great physician, was a direct descendent of Aesculapius, the patron saint of doctors.

To find a beautiful cluster of stars, M5, in Serpens, you might start from α -Serpentis, 20° due south of Corona Borealis. Then go 4.3° further south and 6.6° west. Another approach would be to start at Arcturus, go southeast to Zeta Bootis, then 10° due south to fourth magnitude 109-Virginis. Look to the east to 110-Virginis and continue in a straight line an equal distance to find the beautiful star cluster. The five thousand stars in this cluster are 27 thousand light years distant.

In the other part of Serpens, across Ophiuchus from the head of the snake, in Serpens Cauda, is M16, an open cluster of about 60 stars surrounded by an interesting and vast nebula crossed by dark formations of dust clouds. This is the Eagle Nebula, named for the shape seen projected against the bright luminous background. This is the location of the amazing Hubble Space Telescope *Pillars of Creation* image that captured everyone's imagination when it was recently released. The gigantic, eerie columns of molecular hydrogen gas seen in that photo serve as incubators for new stars. They are 7000 light years from Earth.



The M16 Eagle Nebula—the eagle formed by dark dust features in front of the luminous gas cloud—combines with a star cluster to form a stunning sight, as captured in this photo by Conrad Jung, taken from Fremont Peak.

Studies prove that the M16 stars are very young, perhaps 800,000 years old, on average, as contrasted to the age of the M5 stars, which are 10 billion years old.

Another open cluster of stars lies at the northern limits of Serpens Cauda. Designated IC4756, this is an area best seen in binoculars, as it occupies an area about a degree in diameter.

Eastbay Astronomical Society

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Immediate Past President:	Betty Neall, <i>ex officio</i>	(510) 533-2394

Articles and photos for *The Refractor* are encouraged. Deadline for the September issue is August 27, 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.cri.com. For further information please call (510) 284-4103.

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

Eugene Shoemaker

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National Medal of Science in 1992 in recognition of "his pioneering research and inspiring leadership in the geological exploration of the solar system; ... his entrepreneurial creation and direction of the Branch of Astrogeology of the USGS; and ... his research on Earth-approaching asteroids and comets and their potential impact effects."

A member of the National Academy of Sciences, he received Doctorate of Science degrees from Arizona State University, Temple University, and the University of Arizona. Their highest medals and honors have been awarded by the American Geophysical Union, the Meteoritical Society, the Rittenhouse Astronomical Society, and the American Astronomical Society.

In addition to being a superb scientist, Gene took the time to educate the public on the excitement of planetary science and was an enthusiastic mentor of younger scientists.

Dr. Shoemaker spent numerous summers (Australian winters) searching ancient parts of the earth for records of meteorite and comet impacts. His explorations revealed a number of new craters. In much of his asteroid and comet work, Gene collaborated closely with his wife, Carolyn, a planetary astronomer. Together they initiated the Palomar Planet-crossing Asteroid Survey in 1973, and the Palomar Asteroid and Comet Survey in 1983. Their work (with collaborators *Levy et al.*) has given a good statistical count of the population of earth-crossing asteroids, showing the population is large and is significant for life on the Earth. Carolyn, of course, is the premier discoverer of comets in history. The brilliant impact of Comet Shoemaker-Levy 9 on Jupiter (1994) was probably the most dramatic physical event seen in the solar system in recorded history.

In 1981 the Shoemakers commenced their annual pilgrimage to inland Australia, venturing hundreds of miles off the beaten track into the most remote areas. The couple became well known to station people, farmers, and exploration geologists, and wherever they went Eugene Shoemaker captivated people's imagination with his all-encompassing enthusiasm, love of the land, quest for understanding, and warm personality.

His colleagues at the USGS remember an exceptionally brilliant, exuberant, vibrant man and a warm human being whose angry antics over copy machines and loud happy laughter rang down the hallways. One colleague remembers a time when a new employee overheard Gene's excited conversation and laughter at a meeting and remarked "Who is that loud guy?"—To which he replied "That is the "god of planetary geology" and we all know that gods don't whisper." Gene Shoemaker's legacy will never be a whisper, but a loud burst onto the realm of geology and planetary science.



Eugene and Carolyn Shoemaker at the Palomar Observatory, 1994.

Roberts Rules

By Carter Roberts

This month will see four special activities of particular interest to EAS members, with another community service event in early October. First is the **Fremont Peak Star-B-Que**, for which details were given last month. See you there!

Bort Meadows Star Party for EBRPD

The annual Bort Meadows star party will be the evening of Thursday, August 7. EAS will host this gathering in cooperation with the East Bay Regional Park District. Sunset will be at about 8:11 p.m. PDT. Venus will be 17 degrees above and 28 degrees left of the Sun. Mercury is slightly below and to the right of Venus but may be lost behind the horizon. Higher still is the Moon which will be 19% illuminated. Mars will be left of the Moon. Jupiter will rise about sunset. We urge any members who can to attend this event. And please cajole your children and your neighbors' children to come along with you—they'll enjoy the evening, as I'm sure you will too. If you can bring your telescopes and/or binoculars you can more easily help introduce the public to astronomy; but your attendance is the most important. Come!

To reach Bort Meadows, start from the intersection of Skyline Boulevard and Redwood Road and drive east and south on Redwood 4.4 miles along the way toward Castro Valley. This will take you past the entrance to Redwood Regional Park and beyond the intersection with Pinehurst. The side road to Bort Meadows (once known as the Grass Valley picnic area) is to the right. At the fork in this track, keep right if you are transporting telescopes; otherwise, go left to park and walk to the viewing area. Please try to arrive before 7:30 p.m.

Chinatown StreetFest

The Annual Chinatown StreetFest will take place from 10 a.m. to 6 p.m. on Saturday and Sunday, August 23 and 24. This is always one of the best events in Oakland. EAS will once again help out COSC by showing people the Sun and encouraging them to attend the programs at Chabot. The COSC booth is expected to be approximately where it was last year, on the north side of 8th Street between Franklin and Webster. We will need a few volunteers to help with this event.

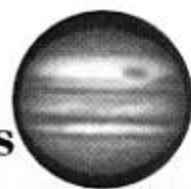
EAS Night at Fremont Peak

I have reserved the Fremont Peak Observatory with the 30-inch Challenger Telescope for our use on Sunday, August 31, which is part of an early Labor Day weekend. This is a rare opportunity to have an observing session on a night when the telescope is available, our TMW is not meeting, and there is no work the following day! Dave Rodrigues will give us one of his fabulous presentations and we will be able to observe until everyone is tired out! For those of you who would like to make a long weekend of it, Dave and I will also be giving the public program the previous night.

Festival at the Lake

Another traditional activity for our club is the Festival at the Lake. The event this year will be the weekend of October 11-12. Although these dates are contentious in coinciding with the Jewish celebration of Yom Kippur, this festival is one that draws a huge crowd and we will have the opportunity to set up solar viewing and to have a good time at Lake Merritt. Mark your calendars, and plan to help us with this pleasureable effort.

José's Observations



by José Olivarez

Now that the planet Jupiter is rising in the east-southeast after 9:00 p.m. it's a good time to start planning to see as much of its atmospheric features as possible. There is the Great Red Spot to see, plus dark spots and bright ovals among the equatorial belts and zones. There are also graceful bluish festoons at the southern edge of the Equatorial Zone! How can you see these? Use a telescope of at least 4 inches of aperture (an 8-inch or a 10-inch would be ideal) and use a power of about 150× on 4-6" apertures and 200-250× on 8-10" apertures. The use of a light blue filter like the Wrattan 82A will help improve the contrast among the bright and dark features that are characteristic of Jupiter's atmosphere. Also, during August, try to observe the planet late in the evening when Jupiter will be higher in the sky and by when the evening temperature will have become stabilized. These conditions will give you better "seeing" and therefore more detail to see on Jupiter's cloud tops.

If you make any detailed sketches of the planet or take photographs, please pass copies on to me for analysis—I'll be glad to tell you what you saw on Jupiter.

By the first of September I will be adding a new *Chabot Observatory Jupiter Page* to the COSC Web site. The page will feature recent photos and current longitude locations of the Great Red Spot, as well as those of other important features. I will also describe the general appearance of the belts and zones and point out interesting cloud formations. You can access this new *Chabot Jupiter Page* at <http://www.cosc.org>. Consider browsing it often during the current Jupiter apparition.

The Chabot Starry Nights Gift Shop is stocking a growing number of signed first editions of important astronomy books by California authors. Be sure to stop by and consider picking up a signed book by authors Timothy Ferris, Buzz Aldrin, Donald Goldsmith, and Mike Reynolds.

Finally, part of Chabot's new Mars planetarium program, *An Evening on Mars* is in 3-D. Stop by and have a look.

Memorials

Clyde W. Tombaugh

In memory of Clyde W. Tombaugh, a stained glass window will be placed at the Unitarian Universalist Church of Las Cruces, New Mexico. Clyde and his wife, Patsy, were among the founders of the church in 1955, and remained dedicated patrons. On the east side of the church building, the New Mexico sun will bring the window and the community to life each day.

This window is an appropriate way to honor Tombaugh's memory because of all the light and color he brought during his many years of service to his community and to the world. Local artist Jackie Clark has been commissioned to design and create the window, the central theme being the universe and the solar system, including its ninth planet, Pluto, which Clyde discovered in 1930. It is envisioned that the window will also depict in some way Clyde's ability to inspire young people and also his keen sense of humor.

You are invited to join as a co-sponsor of this project. The names of all donors will be inscribed in a memory book to be kept near the window wall. Donors of \$100 or more will be recognized on a permanently attached engraved bronze plaque. Send your donations (tax deductible), with your name and address, to Clyde Tombaugh Memorial, c/o UU Church of Las Cruces, 2000 S. Solano, Las Cruces, NM 88001.

Eugene Shoemaker

A memorial service will be convened some time after the return of Dr. Shoemaker's family from Australia. It will take place at Meteor Crater, near Winslow, Arizona.

In addition, it has been proposed that craters on the Moon be named in honor and in memory of Eugene Shoemaker. While there is a tradition of reserving such names for persons who have been dead for at least three years, it is possible to make exceptions. If you are in favor of this idea, you can address your support to the following people:

Jenny Blue <jblue@flagmail.wr.usgs.gov>

Ted Bowell <ted@lowell>

Ben Zellner <ZELLNER@gsvms2.cc.gasou.edu>

Behind the Scenes at JPL

Continued from page 1

tion of slides, posters, and gifts at nominal cost. Anyone can obtain from the Teaching Center various video tapes covering such topics as *The Best of JPL*, *JPL Computer Graphics*, and *Travels of Voyager and Galileo* for only the cost of a blank video tape. I got about 48 hours of tapes at the resource center and four hours of tapes at the gift shop. I will bring all the tapes they provide so you can sample them. There are various posters and a teacher's kit for free! I will tell you at the meeting how you can get these materials without the trouble of going to JPL yourself.

I attended the Pathfinder Press Conference as a member of "the press". It turned out that I had met one of the scientists, Dr. Tim Parker, in the White Mountains! He is the one finding images of "bounceprints" on Mars and helping to figure out how far Pathfinder rolled and bounced before coming to a rest. I will relate some interesting facts he told me about the mission.

The high point of my visit was yet to come, when I got to visit the Mars Pathfinder control area. I got to sit behind the NASA Ames team that is using 3-D Virtual Reality to plan the Sojourner rover's peregrinations around the Martian surface. What an incredible experience! For the first time in my life I walked on another planet! I wish everyone could experience it! If you come to the meeting, however, we will show you Mars in 3-D and teach you how you can see it at home from your computer. Bring red-blue 3-D goggles, if you have them!

In addition to my regular talk, I will end with a brief talk on the life and tragic death of Dr. Gene Shoemaker, whom I had the privilege of visiting only two months ago in Flagstaff.

What's exciting about Mars Pathfinder, Galileo, Cassini and other JPL missions? What are some of the great educational materials that are available at JPL? How can I see the Mars landing site in 3-D? For the answers to these and other questions make sure you attend this EAS meeting.

Welcome New Members

The following friends of astronomy have joined with the Eastbay Astronomical Society since the first of this year. We welcome each of them most sincerely.

David Abercrombie	Oakland
Richard Bolocek	Oakland
Timothy Brockett	Oakland
Robert E. Brylawski	Oakland
John W. Castillo	Oakland
Jean and Morton Cathro	Moraga
Ian Conger	Fremont
Glen Dahlbacka	Oakland
Rebecca Donian	Antioch
Douglas F. Dooley	Castro Valley
Renée Dreyfus	Richmond
Kevin Eastman	Orinda
Avra Betsy Elbinger	Fremont
Timothy Fahey	Newark
Hugo Garcia	Half Moon Bay
Eric Gerrick	San Francisco
Charles Grant	Livermore
Michael C. Hanley	Berkeley
David R. Harkness	Oakland
Winifred B. Heppler	Berkeley
John Hewitt	Berkeley
Timothy J. Hiler	Oakland
Kim and Larry Jack	Hayward
Lonhyn Jasinskyj	Santa Clara
Samuel C. Larsen	Oakland
Michael Loper	Concord
Yvonne Malloy	Santa Clara
Curtis Manning	Berkeley
Amelia S. Marshall	Oakland
Axel Mellinger	Berkeley
Kira E. O'Day	Berkeley
Jorge M. Oliviera	Union City
Samuel R. Paniccia	Santa Cruz
Diana and Alan Peters	Fremont
Nicholas W. Pledger	Oakland
Bruce Prickett	Fremont
Renee E. Reynolds	Oakland
Richard Ryan	Hayward
James Scala	Lafayette
Denise Schmidt	Berkeley
George D. Shotts	San Francisco
Hilary Small	Benicia
Juliana and Richard Spector	Oakland
Shayna Stanis	Kensington
Mike Stanly	Hayward
Ira Stein	Oakland
Allan H. Stern	Castro Valley
John Stewart	El Cerrito
Anthony Stillman	Richmond
Paul Stoddard	San Lorenzo
Andrew Streitwieser	Berkeley
Spencer W. Strellis	Oakland
Ken Swagerty	El Sobrante
George Takahashi	Oakland
Elizabeth and Richard E. Tremaine	Clayton
Clarence G. Underwood	Pittsburg
Meredit H. and Vernon Wallace	Dublin
Sandra Weeks-Capps	Pleasant Hill
Robin Weiss and Family	Orinda
Paul D. Werner	Richmond
Rik Winter	

Comet Comments *by Don Machholz*

A new comet has been recently discovered in the southern sky. Meanwhile, Comet Hale-Bopp continues to dim in the southern sky. Both comets will be briefly visible to many Northern Hemisphere observers in a few months.

The new comet was discovered by Vello Tabur of Australia on July 2. He used an 8-inch f/4.7 reflector to find the tenth magnitude object, which was situated in the morning sky, far south of the Sun and out of view of Northern Hemisphere observers. It was Tabur who had made the last visual discovery—nearly a year ago. Comet Tabur (C/1997 N1) will appear in the evening sky for northern observers in early September.

The solar-orbiting satellite SOHO has picked up five additional small comets as they headed toward the Sun. Most of the 17 comets found by the satellite belong to the Kreutz Sungrazing Group; all were faint and seen only by the satellite. Most disappeared as they rounded the Sun.

Comet Hunting Notes: With Tabur's find, six of the last seven visually-discovered comets have been found south of the celestial equator; and 14 of the last 17 visually-discovered comets have been found in the morning sky.

Date (00UT)	R.A. (2000)	Dec.	Elong.	Sky	Mag.
C/1995 O1 (Hale-Bopp) [Canis Major-Puppis]					
07-31	07h18.8m	-12°36'	37°	M	4.6
08-05	07h24.3m	-14°28'	39°	M	4.7
08-10	07h29.6m	-16°21'	42°	M	4.9
08-15	07h34.7m	-18°16'	45°	M	5.0
08-20	07h39.5m	-20°13'	47°	M	5.1
08-25	07h44.1m	-22°11'	50°	M	5.3
08-30	07h48.4m	-24°11'	52°	M	5.4
09-04	07h52.4m	-26°12'	55°	M	5.5
09-09	07h56.2m	-28°15'	58°	M	5.6
C/1997 N1 (Tabur) [Hydra-Leo-Ursa Major]					
07-31	08h12.7m	-07°39'	27°	M	6.9
08-05	08h42.8m	-02°21'	20°	M	6.2
08-10	09h10.9m	+03°24'	12°	M	5.7
08-15	09h37.7m	+09°31'	5°	M	5.5
08-20	10h04.2m	+15°35'	4°	E	5.8
08-25	10h31.1m	+21°08'	11°	E	6.4
08-30	10h59.0m	+25°56'	18°	E	7.1
09-04	11h28.5m	+29°58'	24°	E	7.8
09-09	11h59.7m	+33°15'	30°	E	8.4

Object	Hale-Bopp	P/Tabur
Peri. Date (1997):	04 01.13800	08 15.24722
Peri. Dist (AU):	0.9141405	0.3832189
Arg/Peri (2000):	130.58915°	345.44824°
Asc. Node (2000):	282.47069°	148.24000°
Inclin. (2000):	089.42943°	086.40198°
Eccentricity:	0.9951172	1.0
Orbital Period:	~2500 years	Long Period?

Now in the Starry Nights Gift Shop

The Hunt for Life on Mars

By the renowned science writer, **Dr. Donald Goldsmith**

A limited number of copies, signed by the author, are available for \$24.50. The gift shop is open Friday and Saturday evenings from 7 to 11 p.m.

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

- 3 1997 New Moon, 01:15 PDT = 08:15 UT
- 4 1997 Mercury at greatest elongation east
- 9 1997 Jupiter at opposition
- 11 1997 First Quarter Moon, 05:43 PDT = 12:43 UT
- 12 1997 Perseid meteors
- 18 1997 Full Moon, 03:57 PDT = 10:57 UT
- 24 1997 Last Quarter Moon,
19:25 PDT = 02:25 UT 25 August

NCHALADA

Saturday, August 16, 9 a.m. - 5 p.m.
Chabot Observatory

Morning session: **Alan Fisher**, chair
The History of Zero: Much Ado About Nothing

Afternoon session: **Nancy Cox**, chair
The Vatican Observatory

FUTURE CONJUGATIONS

- 2 August. Star-B-Que. Fremont Peak.
- 7 August. EAS/EBRPD Star Party.
Bort Meadows.
- 9 August. EAS meeting. Dave Rodrigues.
- 14 August. EAS Board meeting.
- 16 August. NCHALADA.
- 23-24 August. Chinatown StreetFest.
- 30-31 August. Public Program. Fremont Peak.
Join Dave Rodrigues and Carter Roberts.
- 11 September. EAS Board meeting.
- 13 September. EAS meeting. Ken Crowell.
Planet Quest:
The Epic Discovery of Alien Solar Systems.
- 26-27 September. Nightfall. Borrego Springs.
Sponsored by RTMC.
- 11-12 October. Festival at the Lake.

Rotary-Chabot Planetarium Shows

Fridays and Saturdays, 7:30 p.m.
For information and show schedule, call (510) 530-5225.
An Evening on Mars through September 27



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