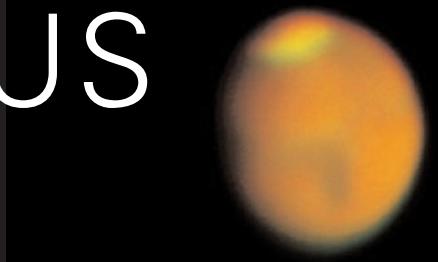
# PRIMEFOCUS

Tri-Valley Stargazers

August 2003

TVS

Tri-Valley Stargazers

**Meeting Info:**

**What**
*Lunar Anomalies*

**Who**
Greg Mack

**When**
August 15, 2003
Conversation at 7:00 p.m.
Lecture starts 7:30 p.m.

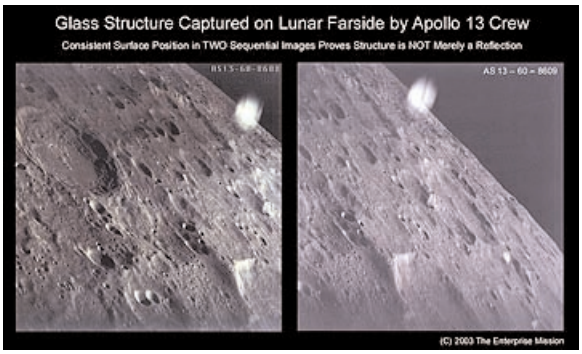
**Where**
Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

## Inside



## August Meeting

### Lunar Anomalies
*Greg Mack*




Our speaker this month is TVSer Greg Mack. His talk will provide a brief overview of scientific analysis of possible ancient artificial structures found on hundreds of archived NASA photos. This material — most of it held in NASA archives for more than a quarter of a century — is part of a continuing investigation by several hundred researchers worldwide into possible "suppressed" NASA solar system findings.

Also discussed will be Transient Lunar Phenomena (TLP). TLPs (temporary changes, colored lights, flashes, etc.) have been observed on the moon and documented for more than four centuries.

Reference materials will be identified including a forty-year old "obscure report" prepared for NASA by the Brookings Institution.

## Mars

Mars makes its closest approach to the Earth on August 27, when it is just 34.5 million miles away. Well, ok, 34,646,418 miles to be more precise. The last time it was this close was approximately 50,000 to 100,000 years, give or take a few thousand years. It will get even closer on August 28, 2287. But don't let these numbers make you think Mars keeps its distance in all those years in between. Mars makes close approaches to the Earth every few years, and sometimes the distances are only a few thousand miles difference from this month's close approach.

Mars has the largest volcano in the solar system, Olympus Mons. It is 15 miles high (around 78,000 feet). In comparison, Mt. Everest is 5.5 miles high. The base of Olympus Mons is 360 miles in diameter — it would cover the state of Missouri. Another large feature on Mars is a 6 mile deep canyon called Valles Marineris. It is as long as the United States is wide — about 1,700 miles long and up to 300 miles wide.

Diameter:
4,216 miles

Average Distance from Earth:
49 million miles or 4.4 light minutes

Day: 24.6 hours

Year: 687 days

Moons: Phobos (Fear) 17 mi long, and Deimos (Terror) 14 miles long.

Atmosphere is 95% carbon dioxide, 2.7% nitrogen.

Temperature: Summertime temps are around -20°F during the day, dropping down to -123°F at night.

# News & Notes

## Welcome

TVS welcomes these new members to the club: **Jacob Sell**, **George Takahaski**, **Michael Allison**, and **Steve** and **Denise Van Tassell**.

## 2003 TVS Meeting Dates

Below are the next few TVS meeting dates. The lecture meetings are held on the third Friday of the month, with the Board meeting on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the Oct. 5th deadline is for the Oct. issue).

| **Lecture Meeting** | **Board Meeting** | ***Prime Focus* Deadline** |
|---|---|---|
| Aug. 15 | Aug. 18 | Aug. 3 |
| Sept. 19 | Sept. 22 | Sept. 7 |
| Oct. 17 | Oct. 20 | Oct. 5 |

## Money Matters

At the July Board meeting, Treasurer **Gary Steinhour** gave us the account balances (as of July 20, 2003) of TVS's accounts:

| | | |
|---|---|---|
| Checking | $1,339.71 | |
| CD #1 | $3,911.19 | matures 08/17/03 |
| CD #2 | $2,413.74 | matures 08/27/03 |
| CD #3 | $2,060.25 | matures 10/16/03 |

## H2O Work Party

TVS is having another work party to spruce up our observatory. Last time we dealt with the exterior by giving it a fresh coat of paint. This time we'll be tackling the interior. We will be taking out the carpeting, sweeping away the spider webs, and removing all the little presents the mice have left us.

If you'd like to join in on the fun, there will be a caravan leaving the corner of Mines and Tesla at 9:00 a.m. on Saturday, August 16. If you are a key holder, you may come down any time you like.

# Astronomical Insights

***by David Feindel***

Summer brings the annual Yosemite Star Party for TVS. Our turn this year was the 4th of July weekend, offering a bonus third night for those who arrived early on Thursday night. The skies did not disappoint, providing a glowing Milky Way almost from horizon to horizon all three nights. Dave did his usual superb job educating — and entertaining — over 400 people during his lectures, as well as pointing out numerous observing highlights afterwards. My kids' favorite was seeing the triplet NOSS satellites orbiting overhead in formation, performing their secret mission. But there were plenty of other satellites to see; my daughter counted 23 on Saturday night. Several visitors (and TVS'ers) were struck by their first view of a waterup (ie, Nevada Falls viewed through an inverting finder scope, causing the water to fall upwards). My most memorable sight was a "god's eye view" looking down at the "stars" in Yosemite Valley from Glacier Point at 1:30 in the morning. Completely surrounded by quiet, the view is spectacular. Another non-celestial highlight was our visitor about 1 am on Thursday night; a deer wandered in and was quite content to nibble on vegetation about 15 feet from us for 10 minutes; completely unfazed by the red flashlights shining at her so us humans could identify her.

Celestial highlights were too numerous to mention; M51, the Whirlpool Galaxy, through an 18" dob; M11, the Wild Duck Cluster; Mars suddenly popping up over the mountains (although not a steady image for another hour or more), all the usual eye candy. What started out as a quick tour of the globular clusters in the Sagittarius region turned into an hour-long study, contrasting size, density, rifts, etc. Another night was spent following Sue French's Small Scope Sampler article out of S&T; a wonderful source for an evening's observing program.

*continued page 7*

# Calendar of Events

## Classic Sci-Fi Film Series

### Chabot Space & Science Center

The movies are shown in their original theater format at the 60' Tien MegaDome Theater. Tickets are $5 per person and are available at the door, at TicketWeb.com, or the Chabot Box Office, 510-336-7373.

Movies:

*Batman*, October 3-5

Showtimes:

Friday – Sunday on the first weekend of each month.

Friday & Saturday – 7:30 p.m., Sunday – 4:00 p.m.

**Newsletter header image**: Mars

Mars, as seen on July 2, 2003 at 2:20 PST. Photo was taken afocal projection with an 18mm eyepiece, a Nikon 4500 digital camera, and Rachel – the 20" f/16 refractor at the Chabot Space and Science Center. The image is comprised of five 1/8 second images stacked.

*Photo: Conrad Jung*

## Calendar of Events *continued*

**August 9, 7:00 p.m.**
What: *Mars: The Search for Life on the Red Planet*
Who: Dr. Chris McKay (NASA)
Where: Chabot Space & Science Center, Oakland
Cost: $7 (EAS members get in free)

Dr. McKay is part of the team that announced the possibility that fossilized microbes exist inside Martian Meteorite ALH84001. He will tell us about that experience and what it means to our understanding of the history of the solar system.

**August 21, 7:30 p.m.**
What: *Mars, Astrobiology and Planetary Protection*
Who: Dr. Margaret Race (SETI)
Where: Chabot Space & Science Center, Oakland
Cost: $7

Join us to hear one of the most renowned experts in planetary protection, the discipline of keeping Earth microbes from contaminating other bodies we visit. Dr. Race will tell us why such protocols are important in our plans to explore our nearest neighbors in the quest to find life.

**August 21, 8:00 p.m.**
What: *The New Era of Mars Exploration: Follow the Water*
Who: Dr. Ginny Gulick (NASA-Ames Research Center)
Where: Mt. Tam
Cost: $3

With two spacecraft orbiting Mars and three more on their way, we have moved into a new era of Mars exploration.

The lecture is held in the Mountain Theater, telescope viewing is in the Rock Springs parking area. For more information and directions, call 415-455-5370 or 415-388-2070, or visit www.mttam.net.

**August 28, 7:30 p.m.**
What: *Martian Meteorites: What They Tell Us About Mars & Life*
Who: Dr. Tim McCoy and Dr. Cari Corrigan, (Smithsonian Institution)
Where: Chabot Space & Science Center, Oakland
Cost: $7

Take a look through the eyes of a geo-biologist and a meteorite expert at what rocks from Mars can tell us about the formation of our solar system and the life that may have existed in those early formative periods.

**August 30, 6:30 p.m.**
What: *Traveler's Guide to Mars*
Who: William Hartmann
Where: Chabot Space & Science Center, Oakland
Cost: $7

Internationally known astronomer and artist William Hartmann takes us on a travelogue to the Red Planet in this look at what a tourist to Mars would discover.

## News & Notes *continued*

### 2003 Observer's Handbook

We still have some RAS Observer's Handbooks left for sale. Since the year is half over, we're selling them at half off — $7.50. The Handbook is a wealth of info, chock full of astronomical info for this year, as well as other timeless info on observing and deep sky objects.

*continued on page 4*

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*Board & Discussion Meetings:*
Round Table Pizza
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**Web & E-mail**

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tvs@trivalleystargazers.org

**Eyes on the Skies**

Eyes on the Skies is a robotic solar telescope run by Mike Rushford (rushford@eyes-on-the-skies.org). You may access it by visiting www.eyes-on-the-skies.org.

# Astro Events

## Star Parties

### Starry Starry Nights
August 15-17; 22-24

**Don Machholz** is the host for a series of star parties taking place in the Sierra Nevadas. Visit www.geocities.com/donmachholz/StarryStarryNights2003.html for info.

### Sycamore Grove Park
September 6

TVS, in conjunction with the LARPD, will host one more public star party at Sycamore Grove park in Livermore. **Rich Campbell** will give a presentation about the summer Milky Way. For those who wish to help out with telescopes, please be at the park at 7:30 or before to set up your scopes. The talk starts at 8:00. For more info, contact Rich.

### H2O Open House
September 20

Last open house in this year's season. For TVS members who would like to check out our club's dark sky site, the H2O Open House offers them just that chance.

### The Third Annual California Star Party (CalStar)
September 25-27

CalStar, hosted by the San Jose Astronomical Association, will be held at Lake San Antonio. Visit www.sjaa.net/calstar2003.html for details.

# News & Notes *continued*

### Running an After-School Astronomy Program Part 2: Planning Activities
*By Hugh Bartlett*

In Part 1, I described the process of starting your own After-School Astronomy Class. The following describes some ideas for activities, and other considerations in running the program.

### The First Day
Getting off to a good start is so important. You only get one chance to make a good first impression. Start by introducing yourself, how you got interested in astronomy, and what your current astronomical activities are. If you have a co-leader, have that person do their own introduction.

Then get to know your students. Have each one introduce themselves and say a little about why they took the course, or what interests them about astronomy. Some will be unable to verbalize why they are there, other than because their parent signed them up for it. Help each student to express an interest in something. Take notes on their interests and use them to plan activities.

### Discipline
After the initial introductions, you must establish some ground rules. It is better to start out instilling a sense of discipline, and loosen up later. It would be good to have spoken with some of their teachers before hand to find out what signal they use to get the students' attention and get them to quiet down. Whatever is already in use will be most effective for you. Insist that students raise their hand to be called on when they have something to say. Remind them to keep their comments on topic. Schedule the class a few minutes after school ends so they can have a bathroom break before class. And remind them when they arrive that they should take a bathroom break before class starts if they need to. Despite your best efforts, chaos will routinely break out, and your only hope of getting the Genie back in the bottle is to establish some ground rules at the start.

Another first-day administrative matter, especially for elementary classes, is to review pick-up arrangements. It is crucial to know which students will be picked up by parents, and which are going to another after care program when class is done. I would recommend sorting your roster that way, so you can check your students into another program as a group. Take this list with you to class everyday, along with your cell phone. You are the responsible adult, and there is no room for slip-ups when releasing care to others.

### The First Lesson
Now you are ready to start your first lesson. If you have a teacher assistant, always refer to what you and the teacher have planned or will be doing. I started with the basic motions of the Earth about the Sun, and that of the Moon around the Earth. I invented a Left Hand rule, similar to how they teach kindergartners to tell Left from Right by holding them up their hands, palms away from themselves with the thumbs pointing toward each other. In that case, the hand that looks like the letter "L" is the Left Hand. In my technique, I tell them to rotate their hands so the palms face them and the thumbs are up. (The Left Hand still makes the letter "L".) Then I tell them their Left Hand shows the way things Look Like they move in the sky, and the Right Hand indicates how the Earth, Sun, Moon, and other planets Really Rotate. The trick is to point their thumb North and their fingers point the direction things move. For example, I have them put their right palm on the globe with their thumb pointing North and rotate it in the direction of their fingers. Everything in the solar system (except Venus and Triton) both rotate the same direction on their axes and revolve around the Sun in the same direction. If they can

remember that rule, they can figure out how solar system objects move for themselves!

If chaos has not broken out yet, you should have time to cover Moon phases in the same class. This is always harder in practice than it sounds. I gave each student a small Styrofoam ball to be their Moon, told them their head was the Earth, and used the overhead projector for the Sun's light. Following the Right Hand Rule, they rotate the ball around their head to see the phase change from new Moon to full and back to new. The only disconnect is that they cannot spin their heads independently from their arms to mimic the daily sunrise & sunset cycle. For that reason, it is really useful to bring a globe. ASP and Edmund Scientific's also sell a geared "Orbiter" model that duplicates the motions of the Moon around the Earth, and the Earth around the Sun in their proper proportions.

### Teaching Techniques

The abilities of the students to concentrate wanes rapidly in the late afternoon. Therefore, I tried to follow a simple format: 1) Tell them what they will be learning about, 2) Present the material in an interactive "Socratic" question and answer style, and 3) Review what they had learned. The key here is repetition. This was then followed by an activity, which usually took up most of the class.

A similar format can be used for activities. For example, first tell the class what they are going to do. Then, demonstrate how to do it. And then let them do it themselves. Ideally, you should conclude by reviewing what the activity demonstrated. All too often, however, that last step was reserved for the following week, because the Genie had already left the building! (It also gave me time to compose a handout that made sense of what had transpired, which could have been something totally unexpected.)

### Other Classes

Starting out, I knew certain topics that I considered essential. Besides the first Global Sensations lesson, I had classes on: Learning the Constellations, Making Constellation Cookies, All About Telescopes, the Science of Light, the Nature of Stars, Sunspot Observing, the Cosmological Time and Distance Scale, and two sessions centered around looking at pretty slides — one for the Solar System, and one for Deep Sky Objects. One particularly exuberant class was a fusion dance that choreographed the three-step process that takes place inside stars to convert Hydrogen to Helium. With the Pointer Sisters supplying the theme song, "Neutron Dance", six proton dancers come together in various stages to form a Helium atom. Hats were provided to represent the positive electrical charge, which two of the protons got to release in becoming neutrons. It was a bit over their heads (pun intended), but a handout the next week helped explain the science behind the fun. There are certainly a lot more subjects that can be presented, depending on the interests and abilities of your group. The key is to design some activity that relates to the material.

Observing is also something you will want to include. While most after-school programs end before it gets dark, good daytime solar observing is usually possible. Naturally, the day I had planned for this was cloudy. Fortunately, I had previously incorporated a little solar observing during my session on telescopes. In addition, I held two star parties at Oakland's Chabot Observatory. That made it easy on me, because the Observatory scopes are available for free, and several amateurs set up their telescopes for public viewing as well.

### Reflections

"I thought I met a man who knew the truth. I was mistaken. It was only a reflection of a child laughing in the sun." - *David Crosby*

Before the last class, I received an ASP survey to test the public's awareness of basic astronomical concepts. "Great!" I thought, "I'll test my class." Despite my wife's sage advice that it was way too hard for 4th graders, I gave it as a take-home exam. Only one student remembered to bring it to the last class, and another complained I had not covered the material. As we went over the test, it became clear they were guessing at almost every question.

Crestfallen, I began to reflect on my effectiveness as a teacher. Usually, I got so stressed out trying to get all my handouts copied, and remembering to take everything I needed for class, that I did not spend much time rehearsing how to present the material. I'd just showed up and winged it. The kids had a great time, and I got a lot of praise from the parents saying how much their children liked the class, and how it was inspiring them to learn more about astronomy.

Maybe I had not done such a bad job after all. Many astronomical concepts require a high school knowledge of geometry, chemistry, or physics. Still, I can see much room for improvement. Some of my lessons required a little more building up of the basic concepts like what an atom is, or how an ellipse is formed. At this level, the instructor needs to forget everything that seems intuitive based on prior knowledge, and start from scratch. Along those lines, a greater emphasis on the history of astronomy might have helped lay a foundation by showing how great thinkers figured out elementary principles like gravity and planetary motion. Nevertheless, the students found the class to be a lot of fun. If you can mix in enough seeds of truth, the hope is that the fun will inspire them to follow up and learn more.

### Conclusion

I hope my story will inspire some of you to start your own class. It was a lot of hard work, but it was fun and

*continued page 7*

# What's Up *by Debbie Dyke*

All times Pacific Daylight Savings Time unless otherwise noted.

## August

4 Mon **First Quarter Moon** 12:28 a.m.
Neptune at opposition (4348 million km from Earth) 6:00 a.m.

8 Fri St. Dominic – patron saint of astronomers.

11 Mon **Full Moon** 9:48 p.m.
1877 Asaph Hall Sr. discovers Mars' moon Deimos.

12 Tues **Perseid meteors** peak at 10:00 p.m.

14 Thurs Mercury at greatest elongation east (27°) 2:00 p.m.

15 Fri **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.

16 Sat H2O work party. See page 2 for details.

17 Sun **Tri-Valley Stargazers discussion meeting**. 2:00 p.m. at the Round Table Pizza on 1024 E. Stanley Blvd., Livermore. Discuss astro stuff with your fellow members.
1877 Asaph Hall discovers Mars' other moon, Phobos.

18 Mon **Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.
Venus at superior conjunction.

19 Tues **Last Quarter Moon** 5:48 p.m.

20 Wed 1975 Viking 1 was launched
1977 Voyager 2 launched toward Jupiter and Saturn.

22 Fri Jupiter at superior conjunction (far side of the Sun).

24 Sun 1989 Voyager 2 flies past Neptune.
Uranus at opposition (2845 million km from Earth) 3:00 a.m.

25 Mon 1981 Voyager 2 flies past Saturn.

27 Wed **New Moon** 10:26 a.m.
**Mars makes its closest approach to the Earth in nearly 100,000 years** (give or take a few thousands of years) at a distance of 34.5 million miles. Get thee to a telescope and observe Mars now! You won't have a better view until 2050.

28 Thurs Mars at opposition 11:00 a.m.

30 Sat Mars at perihelion.

Did you know that while you're looking at Mars, it's looking back at you and smiling? This feature is called the Happy Face Crater and is located on Mars.

## September

1 Mon Labor Day
1979 Pioneer 11 is first craft to fly past Saturn.

3 Wed **First Quarter Moon** 5:34 a.m.
1976 Viking 2 lands at Utopia Planitia on Mars.

5 Fri 1977 Voyager 1 launched toward Jupiter and Saturn.

8 Mon 1966 Star Trek debuts.

9 Tues 1975 Viking 2 was launched September 9 and entered Mars orbit on August 7, 1976.

10 Wed **Full Moon** (the Harvest Moon) 9:36 a.m.

11 Thurs Inferior conjunction of Mercury.
1816 Carl Zeiss born.

extremely rewarding. The bottom line is that there is a lot of misunderstanding of basic astronomical concepts, that needs to be addressed. As an amateur astronomer, you already know more about how the universe works than ninety percent of the population. With school budgets in crisis, and the State educational system focused on reading and math scores, science often gets overlooked. You can make a real difference in increasing public awareness of basic astronomical concepts, and get them to appreciate the importance of astronomy. Maybe it will help generate the political support necessary to get a space exploration project funded, or help reduce light pollution.

If you have any questions or comments, you may contact Hugh at: hughandmaret@earthlink.net

NASA's Space Place

## From the Belly of an Airplane: Galaxies

*by Dr. Tony Phillips*

On April 28th a NASA spacecraft named GALEX left Earth. Its mission: to learn how galaxies are born, how they grow, and how they die.

"GALEX—short for Galaxy Evolution Explorer—is like a time machine," says Caltech astronomer Peter Friedman. It can see galaxies as far away as 10 billion light years, which is like looking 10 billion years into the past. The key to the mission is GALEX's ultraviolet (UV) telescope. UV rays are a telltale sign of hot young stars, newly formed, and also of galaxies crashing together. By studying the ultraviolet light emitted by galaxies, Friedman and colleagues hope to trace their evolution spanning billions of years.

This kind of work can't be done from the ground because Earth's atmosphere absorbs the most energetic UV rays.


L-1011 "Stargazer" takes off to carry Pegasus rocket on the first 39,000 feet of its climb to deliver a spacecraft to orbit.

GALEX would have to go to space. To get it there, mission planners turned to Orbital Science Corporation's Pegasus rocket.

"Pegasus rockets are unusual because of the way they're launched-from the belly of an airplane," says GALEX Project Engineer Frank Surber of JPL.

It works like this: a modified L-1011 airliner nicknamed Stargazer carries the rocket to an altitude of 39,000 feet. The pilot pushes a button and the Pegasus drops free. For 5 seconds it plunges toward Earth, unpowered, which gives the Stargazer time to get away. Then the rocket ignites its engines and surges skyward. The travel time to space: only 11 minutes.

"The aircraft eliminates the need for a large first stage on the rocket," explains Surber. "Because Stargazer can be used for many missions, it becomes a re-useable first stage and makes the launch system cheaper in the long run." (To take advantage of this inexpensive launch system, GALEX designers had to make their spacecraft weigh less than 1000 lbs-the most a Pegasus can carry.)

A Pegasus has three stages–not counting the aircraft. "Its three solid rocket engines are similar to the black powder rockets used by amateurs. The main difference is that the fuel is cast into a solid chunk called a 'grain'–about the consistency of tire rubber. Like black powder rockets, once the grain is lit it burns to completion. There's no turning back."

In this case, turning back was not required. The rocket carried GALEX to Earth orbit and deployed the spacecraft flawlessly. On May 22nd, the UV telescope opened its cover and began observing galaxies–"first light" for GALEX and another success story for Pegasus.

For adults, find out more about the GALEX mission at http://www.galex.caltech.edu. Kids can read and see a video about Pegasus at http://spaceplace.nasa.gov/galex/pegasus.html.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



This month's web site is really a link list; try http://members.cox.net/clarkt7/astronomylinks. If you can't spend a full day pursuing interesting links here… I could (and did!), and I thought I had a pretty extensive list of astronomy links already compiled. One other very timely site, www.blackmask.com/books32c/marslowelldex.htm, is a 29,000 word essay (book?) by Percival Lowell on his Mars observations. And if you want to read Alfred Russel Wallace's answer, you can find it on the blackmask site, too.

Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551

**PRIME**FOCUS

# Tri-Valley Stargazers Membership Application

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function.

Name _____ Phone _____ e-mail _____

Address _____

Do not release my: _____ address, _____ phone, or _____ e-mail information to other TVS members.

Membership category: _____ $5 Student.
_____ $25 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ $30 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ $32.95 Subscription to *Sky & Telescope* magazine.
_____ $29 Subscription to *Astronomy* magazine.
_____ $20 Hidden Hill Observatory (H2O) refundable key deposit (key property of TVS).
$_____ Tax deductible contribution to Tri-Valley Stargazers.

$_____ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old, or still in high school.