PRIMEFOCUS
Tri-Valley Stargazers

October 2007

Meeting Info:

What
Globular Clusters

Who
Dr. Graeme Smith

When
October 19, 2007
Doors open at 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

Inside

October Meeting

Globular Clusters
Dr. Graeme Smith

Dr. Smith will give an overview of the properties of globular clusters in our Milky Way galaxy. He'll touch on what these objects are, how they contribute to a fossil record of the earliest stages of the formation of our Galaxy, what sort of stars they contain, and some interesting aspects of the compositions of these stars.

M2 Globular Cluster. *Photo: Conrad Jung*

The main area of Dr. Smith's research has been the properties of the oldest populations of stars within our Galaxy, with regard to both their physical evolution and what they can tell us about the chemical enrichment history of the Milky Way. Much of his work has been directed towards the study of the abundant difference among stars within globular clusters. These clusters are amongst the oldest stellar systems within the Galaxy, having formed at a time when the process of galactic chemical enrichment was just commencing. Striking differences in the abundance of the elements carbon, nitrogen, oxygen, sodium, magnesium, and aluminum typically exist among stars within the same globular cluster. Understanding the origin of these differences can potentially provide information about the early environment in the halo of our Galaxy, within which the globular clusters formed, as well as about processes, such as mixing, occurring within the interiors of their stars.

Another area of interest is that of chromospheric activity among evolved red giants, particularly those of Population II. Spectroscopic studies have been carried out of chromospheric emission lines among old red giants in the Galactic halo. By determining how the chromospheric lines behave as a function of stellar luminosity and evolutionary state it is hoped that some insight may be gained into the processes responsible for chromospheric heating and mass loss among these stars.

Other areas of interest to Smith include the spectroscopy of comets in our Solar System and the chemical composition of red giants in Galactic open clusters.

Dr. Smith is the Professor of Astronomy and Astrophysics, and Astronomer, at the UC Observatories/Lick Observatory. He received his B.S. and PhD at the Australian National University.

News & Notes

2007 TVS Meeting Dates

The following lists the TVS meeting dates for the next few months. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the November 4th deadline is for the November issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Oct 19	Oct 22	Oct 7
Nov 16	Nov 19	Nov 4
Dec 21	Dec 17	Dec 9

Money Matters

At our September board meeting, Treasurer **David Feindel** did not have a report of current TVS account balances. He did mention that the club was still solvent. You can take the account balances from August 18 (below), and add a few dollars to get the balances.

Checking	$3,389.57	
CD #1	$3,656.36	matures 11/17/07
CD #2	$2,557.42	matured 08/27/07

November Election

Our annual election is fast approaching. At the November meeting, club members will vote for who they want for their club officers and board of directors.

The club highly encourages anyone interested to nominate themselves for any of the positions. Members can put their name in the hat for *any* of the positions—President, Vice-President, Secretary or Treasurer. All club officer positions require attending the majority of the board meetings (we meet in Livermore on the Monday following the lecture meeting).

The Secretary takes the minutes of the board meeting and handles all club correspondence (which is minimal). The President presides over the lecture and board meetings. The Vice President takes over when the President is not available. The Treasurer takes care of all the financial matters (club dues, paying bills, etc.).

We also have plenty of room available on the Board of Directors, and could use more input from club members in that capacity. Board members need to show up at the majority of the monthly board meetings, and vote on items presented at the meeting.

Also, some of the volunteer positions could use new volunteers to take on the job responsibilities. We're looking for a Program Director (finds speakers for the meetings) and for the Refreshments Coordinator (who brings the refreshments to the meetings and makes the coffee and tea).

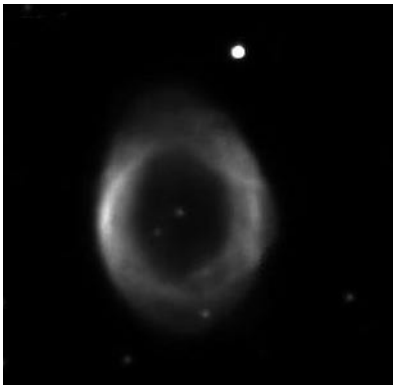
Future Sycamore Grove Star Parties

The Livermore Area Recreation & Park District (LARPD) contacted TVS to see if we were interested in resuming the Sycamore Grove star party series. They did not give any dates, but most likely this will be for next summer.

We would need a volunteer (or volunteers) that can give presentations before the observing begins. The volunteer(s) would need to come up with a program ahead of time, as the District needs the information to be included in their mailings to residents sometime in the late spring.

The Sycamore Grove star parties have been popular among the Livermore residents and TVS members. Usually there is one star party a month during the summer (about four or five total).

If you are interested in volunteering as a presenter, please contact a club officer or board member.



M57 - The Ring Nebula, in Lyra. *Photo: Dave Woolsey, using his brand new Meade DSI Pro CCD camera at Barcroft.*

Barcroft

Some (fool)hardy TVS souls ventured up the long and winding (and dusty) road to the Barcroft High Altitude Research Station for this year's White Mountain Star Party trip. Elevation is 12,470', with a little less oxygen than you'd like. Despite several flat tires on the road up and below freezing observing conditions, the dark skies made the trip worth it. The light from the Milky Way really can cast shadows. Hard to believe, but you can go from a well lit room to outside and see thousands upon thousands of stars, with the Milky Way flowing brightly overhead—no dark adaptation required. Objects that are barely visible in the Bay

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Newsletter header image: M8 - The Lagoon Nebula

The Lagoon nebula, along with a fainter extension region to the east of it. The fainter extension has a number of designations that go along with it. In the image, the feature on the left that looks like one feature has a number of designation depending on which part of the nebula you are looking at. These are some of the designations: NGC 6559, IC 4685, IC 1274, IC 1275.

The image was taken with a Canon 20Da DSLR camera attached to a 90mm refractor at f/5.5. 42 images were combined to make the image, with images taken at both Del Valle and Henry Coe parks. *Credit: Conrad Jung*

Calendar of Events

October 26, 8:00 - 11:00 p.m.

What: *Lunar Lounge Express - Halloween Party*
Who: You
Where: Chabot Space & Science Center, Oakland
Cost: Lunar Lounge: $15 Adult, $10 Student, $8 Member
For reservations, call 510-336-7373

Come dressed in costume and party under the stars at Chabot's monthly nocturnal celebration—The Lunar Lounge Express!

Featuring live music, refreshments, activities and fun!

- Full access to Chabot Space & Science Center interactive exhibits
- SonicVision — a new alternative music Planetarium show
- Telescope viewing in our Observatory Complex (weather permitting)
- Enjoy $3 micro-brews from Buffalo Bill's Brewery
- Enjoy pizza, wine and other refreshments from the cash bar
- And much more!

The **Daniel Stanton Group** will be performing Jazz, Blues and Funk, with a combination of musical styles, earthy singing and fabulous bass playing.

Check out the Lunar Lounge myspace page!

October 29, 7:30 p.m.

What: *Black Holes: Space Warps, Time Machines, and the Excruciating Deaths of Stars*
Who: Andrew Fraknoi (Foothill College & the Astronomical Society of the Pacific)
Where: Kanbar Hall, Jewish Community Center
Cost: $4.00

What is the science behind the science fiction of black holes? What are black holes, how do astronomers find them, and why would falling into one be a once-in-a-lifetime experience? Analogies, slides, thought experiments, and humor, will show how black holes warp space, act like a real time machine, and grow to be enormous at the centers of most galaxies.

You can purchase tickets online at http://www.calacademy.org/lectures/tickets or buy them at the door. For more information, call 415-321-8000.

The Dean Lectures have temporarily moved to the San Francisco Jewish Community Center at 3200 California Street (at Presidio Avenue) during the reconstruction of the Academy.

Parking is available across the street in the UCSF Laurel Heights campus parking lot for $1.25 per night. Parking in the JCC garage is $1.25 per half-hour. The #1 California, #3 Jackson, #4 Sutter, and #43 Masonic MUNI lines stop directly in front of the building. The #38 Geary and #24 Divisadero buses stop only a few blocks away.

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Officers

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Lecture Meeting:
Unitarian Universalist Church
1893 N. Vasco Road, Livermore

Board & Discussion Meetings:
Round Table Pizza
1024 E. Stanley Blvd., Livermore

Web & E-mail

www.trivalleystargazers.org
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.

TVS E-Group

So how do you join the TVS e-group you ask? Just send an e-mail message to the TVS e-mail address (tvs@trivalleystargazers.org) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

Calendar of Events *continued*

November 1, 6:30 - 8:30 p.m.
What: Celestial Navigation Class
Who: You
Where: Chabot Space & Science Center, Oakland
Cost: $95 Regular, $85 Members

Classes are on Thursdays, November 1, 8, 15, & 29

You will learn the basics of the centuries-old technique of Celestial Navigation, the art and science of finding one's way through the world by observing the sky. In a mixture of presentations, hands-on activities, planetarium simulations, and exploration of the night sky, you will learn to recognize and use some of the basic navigational stars and constellations, how to operate a sextant and use its measurements to pinpoint your location on Earth, and a bit of the history of some ancient peoples who used the stars to guide them across the sky.

Call Membership at 510.336.7308 or e-mail bburress@chabotspace.org to reserve your spot now!

November 3, 8:00 - 11:00 p.m.
What: *NCHALADA*
Who: You
Where: Chabot Space & Science Center, Oakland
Cost: Free

The Northern California Historical Astronomy Luncheon and Discussion Association (NCHALADA) meets several times a year at the Chabot Space and Science Center in the hills of Oakland, California. They spend a Saturday morning and afternoon discussing two topics related to the history of astronomy. Between the two sessions, they justify the rest of the their name by having lunch at a local restaurant. After lunch and before the afternoon session, they have a short business meeting to select the topics and date for the following meeting. No proxy votes are allowed, the people actually present are considered to be the whole nchalada.

The group meets in the YH Soda Board Room, by the observatory plaza. After coffee and puns at 9:30, the morning session, *Atmospheric Optics*, will be chaired by Nancy Cox. The afternoon topic will be *Orreries* chaired by Bruce R. Mehlman.

November 18, 12:00 p.m. - Late Afternoon
What: *SJAA Fall Swap Meet*
Who: Bay Area Amateur Astronomers
Where: Houge Park, San Jose
Cost: Free

If you missed your chance at buying astro stuff at the San Jose Astronomical Association's spring auction, you'll have another opportunity at their fall swap meet. As the saying goes, this event is when all the astronomical gear moves from one garage to another. More info about the event will be posted on the SJAA web site: www.sjaa.net.

November 20, 7:15 - 9:00 p.m.
What: *MDAS Swap Meet*
Who: Bay Area Amateur Astronomers
Where: Concord Police Association Facility, Concord
Cost: Free

If you couldn't make it to SJAA's swap meet on the 18th, there's still a chance to get your Christmas shopping done (for yourself, of course!). The Mt. Diablo Astronomical Society is holding their annual swap meet. Good deals are sure to be had by all. www.mdas.net

Astro Events

Viewing Treats for Visiting Monsters

Halloween will be on a Wednesday this year, with the almost Third Quarter Moon rising around 11:30 p.m. Should the skies be clear, consider setting up your scope in your front yard and having all the trick or treaters look through the scope. There are plenty of objects for viewing with large and small telescopes. Just make sure you give the candy *after* viewing so that you don't get chocolate on your eyepiece.

If you have good views to the south, try Jupiter and the M22 Globular Cluster. M6 and M7 in Scorpius are both good in small scopes. There's also the Trifid Nebula (M20), Lagoon (M8), The Swan or Omega (M17), and the Eagle (M16), all in Sagittarius. If you have an OIII filter, try using it on some of these nebulae.

Towards the west, you can try for M13 and M92 Globular Clusters in Hercules.

In the east, the Pleiades (M45) will be rising. The Double Cluster in Perseus would be another good object for a small scope. The Andromeda Galaxy (M31) will be fairly high in the sky, as will the M15 Globular Cluster.

Straight up, Brocchi's Cluster (the Coathanger Cluster) would look nice in a small scope. The Dumbbell Nebula (M27) in Vulpecula is another possibility, and of course, the Ring Nebula (M57) in Lyra.

If the skies are more conducive to double star viewing, Albireo would be at the top of the list. Gamma Andromedae (aka Almach) is another colorful double. There's always the Double Double in Lyra—you can challenge the tricksters to split the doubles.

If you're looking for some more challenging objects for yourself, try The Phantom (M74), a magnitude 10.5 galaxy in Pisces. Or perhaps a selection from Jane Houston-Jones *Scary Halloween Observing* list:

Mirach's Ghost, NGC404 in AND, r.a 01 09.33, dec +35° 43', mag 10.3, 4.3 x 3.9' gxy

The Phantom Streak NGC6741 in AQL, r.a. 19 02.42, dec. -00° 26', mag 12, 9" x 7" pn

Ghost of the Moon Nebula NGC6781 AQL, r.a. 19 18.31, dec +06° 33' mag 11.8, 1.9' x 1.8' pn

The Spider Galaxy in NGC5829 in BOO, r.a. 15 02.45, dec. +23° 20', mag 13.4, 1.7' x 1.5' gxy

The Skull Nebula NGC246 in CET, r.a. 00 47.6, dec -11° 52', mag 8.5, 4' x 3' pn

The Witch Head Nebula. IC2118 in ERI, r.a.05 06.9, dec -07° 13' bright neb

The Ghost Ring IC5148 in GRU, r.a.21 59.38, dec -39° 22', mag 11, 2' pn

Little Ghost Nebula NGC 6369 in OPH, r.a. 17 29.3, dec. -23° 46', mag 10.4 pn

Red Spider Nebula NGC 6537 in SAG, r.a. 18 05.18, dec. -19° 50' mag 12, 5" pn

Phobos and Deimos (Fear and Terror) - the moons of Mars

Hell, Rukl's Atlas of the Moon, chart 64. 33 km crater near Deslandres 32.4° S, 17.7&W

Lacus Doloris (Lake of Suffering), Rukl chart 23, 110 km mare 17° N, 9& E

Lacus Mortis (Lake of Death), Rukl chart 14, 150 km diameter flooded crater, 45° N, 27& E

Lacus Timoris (Lake of Fear), Rukl chart 63, 130 km long mare, 39° S, 28& W

Palus Putrendis (Marsh of Rot), Rukl chart 22, 180 km small plain on the prime meridian, near Hadley Rille and Apollo 15 site, 27°N , 0&

Epsilon (36) BOO, r.a.14 45.01, dec +27° 04.20, double star, mag 2.5 and 4.9, yellow/orange and blue/green double

Mu (51) BOO, r.a.15 24.32, dec. +37° 22, triple star, mag 4.3 and 7 and 7.6 triple, yellow primary, yellow/orange pair

Xi (37) BOO, r.a 14 51.26, dec. +19° 6', quadruple star, mag 4.7 and 7.0, with a 9.6 and 12.6 companion, yellow and reddish/orange

Jupiter Transits

The following are a few listings of transit times for various Jupiter related objects. The abbreviations are fairly straight forward: G=Ganymede, C=Callisto, I=Io, E=Europa, GRS=Great Red Spot, and if you see a 's' next to one of the moons, it means its shadow (e.g., Cs=Callisto's shadow); na means Jupiter is below the horizon or it is daylight at that time.

October

Wed 10	E	na	7:50p	9:12p
	GRS	na	na	8:12p
	Es	8:47p	na	na
Fri 12	I	na	na	7:23p
	Is	na	7:10p	8:24p
	GRS	na	7:50p	na
Sun 14	GRS	7:40p	na	na
Mon 15	GRS	na	na	7:30p
	G	8:19p	na	na
Wed 17	GRS	na	7:07p	9:00p
Fri 19	GRS	7:00p	8:45p	na
	I	7:10p	8:15p	na
	Is	8:08p	9:04p	na
Mon 22	GRS	na	na	8:00p
Wed 24	GRS	na	8:00p	na
Mon 29	GRS	na	7:06p	na
Wed 31	GRS	7:00p	na	na

November

Sat 3	GRS	na	na	8:02p

The following times are DST:

Sun 4	E	na	na	6:02p
	I	na	5:45p	6:51p
	Is	na	6:11p	na
	Es	5:26p	6:25p	na
Mon 5	GRS	na	6:58p	na
Sat 10	GRS	na	6:10p	na

Jupiter is slowing fading into the sunset, getting lower and lower. We'll have to wait for it to make its next evening viewing appearances in August 2008 for the next installment of Jupiter Transits.

Jupiter and Io as seen by the Cassini spacecraft as it passed by on its way to Saturn. *Photo: NASA JPL*

What's Up *by Debbie Dyke*

All times Pacific Daylight Time.

October

3 Wed **Last Quarter Moon**. 3:06 a.m.

4 Thur 1957 Sputnik 1 is launched by the Soviet Union, becoming the first artificial satellite to orbit the Earth.

6 Sat 1995 Discovery of the first extrasolar planet (orbiting 51 Pegasi) announced.

7 Sun The Moon 1.5° from Saturn. 5:00 a.m.

9 Tue Columbus Day.
1604 A supernova appears between Jupiter and Saturn. Kepler notices it on the 17th and studies it.

10 Wed **New Moon**. 10:01 p.m.

12 Fri For the next five days in the early morning sky, Venus makes its way past Saturn, separated by 3-4°.

13 Fri Moon at apogee (252,036 miles). 3:00 a.m.

19 Fri **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
First Quarter Moon. 1:33 a.m.

20 Sat For the next two weeks, look for the Zodiacal Light in the east before morning twilight.
Neptune 2° from the Moon. 8:00 p.m.

21 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.
Orionid meteor shower peaks. 3:00 p.m.

22 Mon **Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.
1975 Venera 9 becomes first spacecraft to return images of the surface of Venus.
The Moon 1.7° from Uranus. 8:00 p.m.

23 Tue Mercury in inferior conjunction. 4:00 p.m.

24 Wed 3936 BC According to Johannes Hevelius, the world was created on this date at 6:00 p.m.

25 Thur The largest **Full Moon** in 2007. 9:52 p.m.

26 Fri Moon at perigee (221,187 miles). Expect large tides. 5:00 a.m.

27 Sat The Moon 2.5° from the Pleiades (M45). 8:00 p.m.

28 Sun Venus at greatest elongation west (46°). 8:00 a.m.

30 Tue Mars 5° from the Moon. 6:00 a.m.

31 Wed **Halloween.**
1992 The Vatican absolves Galileo of all heresy charges.

November

1 Thur **Last Quarter Moon**. 2:18 p.m.

3 Sat The Moon, Saturn and Venus are grouped together in the morning sky in the east.

4 Sun **Daylight Saving Time ends**. 2:00 a.m. Yea!
The Moon slips between Saturn and Venus in the eastern morning sky.

5 Mon The Moon and Venus just 3° apart. 5:30 a.m. PST

6 Tue Election Day.

9 Fri **New Moon**. 3:03 p.m. PST
1934 Carl Sagan born.

11 Sun Veterans Day.
1572 Tycho Brahe discovers a supernova in Cassiopeia. The remnant wasn't discovered until the 1960's.

A Missile in Your Eye

by Patrick L. Barry

Satellite technology designed to catch ballistic missile launches may soon help doctors monitor the health of people's eyes.

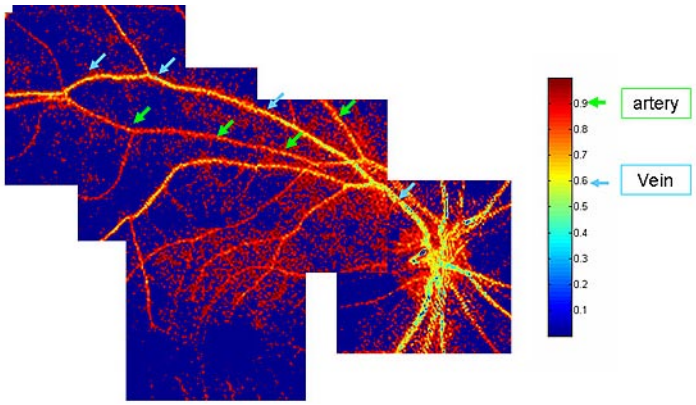
For the last 15 years, Greg Bearman and his colleagues at JPL have been working on a novel design for a spectrometer, a special kind of camera often used on satellites and spacecraft. Rather than snapping a simple picture, spectrometers measure the spectrum of wavelengths in the light coming from a scene. From that information, scientists can learn things about the physical properties of objects in the photo, be they stars or distant planets or vegetation on Earth's surface.

In this case, however, the challenge was to capture snapshots of short-lived events—like missile launches! The team of JPL scientists designed the new spectrometer, called a computed tomographic imaging spectrometer (CTIS), in collaboration with the Ballistic Missile Defense Organization as a way to detect missiles by the spectral signatures of their exhaust.

But now the scientists are pointing CTIS at another fast-moving scene: the retina of an eye.

Blood flowing through the retina has a different spectral signature when it is rich in oxygen than when it is oxygen deprived. So eye doctors can use a spectrometer to look for low oxygen in the retina—an indicator of disease. However, because the eye is constantly moving, images produced by conventional spectrometers would have motion blurring that is difficult to correct.

The spectrometer that Bearman helped to develop is different: It can capture the whole retina and its spectral information in a single snapshot as quick as 3 milliseconds. "We needed something fast," says Bearman, and this spectrometer is "missile-quick."



This three-color composite image from the computed tomographic imaging spectrometer shows the oxygenation of the blood in the arteries and veins of a human retina. (Arteries appear red, veins appear yellow.)

CTIS is even relatively cheap to build, consisting of standard camera lenses and a custom, etched, transparent sheet called a grating. "With the exception of the grating, we bought everything on Amazon," he says.

The grating was custom-designed at JPL. It has a pattern of microscopic steps on its surface that split incoming light into 25 separate images arranged in a 5 by 5 grid. The center image in the grid shows the scene undistorted, but colors in the surrounding images are slightly "smeared" apart, as if the light had passed through a prism. This separation of colors reveals the light's spectrum for each pixel in the image.

"We're conducting clinical trials now," says Bearman. If all goes well, anti-missile technology may soon be catching eye problems before they have a chance to get off the ground.

Information about other NASA-developed technologies with spin-off applications can be found at http://www.sti.nasa.gov/tto.

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

News & Notes *continued*

The Road to Barcroft, starring Bob Hope and Bing Crosby. Hilarity ensues as we follow the intrepid explorers along the desolate road to the Great Quonset Hut in the Sky. *Photo: Dave Woolsey*

Area are hard to miss at Barcroft. Did I mention it was very dark there?

The food was excellent, as usual. Nothing like waking up to the smell of bacon frying. The late night snacks and hot drinks that were there for us really helped to sustain the night's observing run. The oxygen tank in the dining room came in handy for several us. Sign ups for next year's trip start in the late Spring.

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

PRIMEFOCUS

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.
_____ $30 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
_____ $40 Regular. You will receive a paper version of *Prime Focus* in the mail.
_____ $32.95 One year subscription to *Sky & Telescope* magazine.
_____ $34 One year subscription to *Astronomy* magazine.
_____ $60 Two year subscription to *Astronomy* magazine.
_____ $10 Hidden Hill Observatory (H2O) yearly access fee. You need to be a key holder to access the site.
_____ $20 H2O key holder fee. (A refundable key *deposit*—key property of TVS).
_____ $40 Patron Membership. Must be a member for at least a year and a key holder.
$_____ 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.