PRIMEFOCUS
Tri-Valley Stargazers

January 2005

Meeting Info:

What
The Mystery of Extrasolar Planet TrES-1b

Who
Ron Bissinger

When
January 21, 2005
Conversation 7:00 p.m.
Lecture 7:30 p.m.

Where
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

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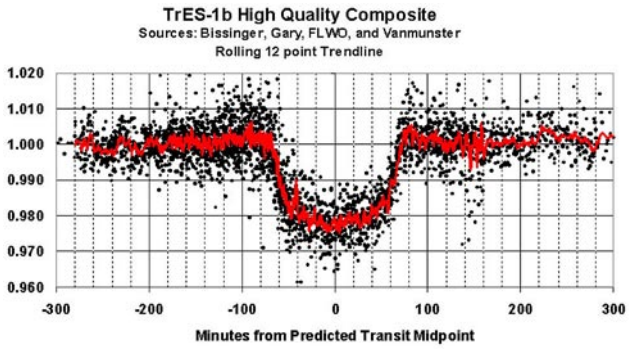
January Meeting

A Distributed Global Observing Network and the Mystery of Extrasolar Planet TrES-1b

Ron Bissinger



Affordable off-the-shelf CCD digital cameras and medium aperture computer controlled telescopes have allowed an increasing number of amateur astronomers to blur the line between amateur and professional astronomers. Amateur astronomers now frequently collaborate with their professional colleagues on cutting-edge research endeavors.

A current example of such an amateur/professional collaboration is the search for extrasolar planets. The American Association of Variable Star Observers (AAVSO) and the Transitsearch.org team have partnered to conduct world-wide observing campaigns of stars that have, or may have, planetary systems. The 2003 discovery of a transiting extrasolar planet designated TrES-1b prompted many amateur astronomers around the world to capture the light-curve as the planet eclipsed, or transited, the parent star.

Several amateur astronomers noted that the TrES-1b transit lightcurves did not follow the classic, sharp-cornered "dips" of other transiting extrasolar planets. These observations lead to an extensive and continuing analysis of the TrES-1b lightcurve to determine whether they indicate the presence of a structure around the planet or its parent star.

Whether or not any structure is ultimately confirmed around TrES-1b, the work exemplifies the high precision observations that are now made by a global group of amateur and professional astronomers formally coordinated over the internet. The concept of a distributed network of observers is discussed and the observations of the extrasolar planet TrES-1b will be presented at our January 21st meeting.

Ron Bissinger, an amateur astronomer in Pleasanton, CA, is an early member of the Transitsearch.org team and has done much of the analysis on the TrES-1b lightcurves.

Ron at his Raccoon Run Observatory.

News & Notes

Thank You Mr./Ms. Anonymous!

TVS received an anonymous donation of $1,000. Thank you so very much Anonymous!

2005 TVS Meeting Dates

Below are 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 March 6th deadline is for the March issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Jan. 21	Jan. 23	Jan. 9
Feb. 18	Feb. 21	Feb. 6
Mar. 18	Mar. 21	Mar. 6
Apr. 15	Apr. 18	Apr. 3
May 20	May 23	May 8

Money Matters

At the December Board meeting, Treasurer **Gary Steinhour** left word of the account balances (as of December 16, 2004) of TVS's accounts:

Checking	$1,487.35	
CD #1	$3,449.61	matures 02/17/05
CD #2	$2,438.11	matures 02/27/05
CD #3	$1,074.96	matures 01/16/05

We have received and paid for a new LCD projector, which was unveiled at the December Potluck. We now no longer have to borrow projectors from the Lab. We can also use the projector for school star party presentations. Welcome to the 21st Century!

TVS Elections

The TVS elections took place at the December pot luck meeting. All of those nominated were voted in. Although our Treasurer, Gary Steinhour, has agreed to continue in his capacity of Treasurer for the moment, we are still looking for someone to take over that position.

We are also looking for a volunteer to fill the position of Program Director. The Program Director is responsible for getting speakers for our monthly lecture meetings

If you are interested in any of the positions, or wish to become a board member, contact any Officer or Board member.

2005 RASC Handbooks & Calendars

We still have a few 2005 Royal Astronomical Society of Canada calendars and Observer's Handbooks available for sale. The Handbooks go for $18.00, the calendars are $10. They will be available for purchase at the meeting.

Cassini Spacecraft Update

By the time we have our January lecture meeting, we will know whether or not the Huygens probe made a successful descent into the atmosphere of Saturn's largest moon, Titan. As of press time, everything is proceeding as planned.

Huygens was released from its mother ship, Cassini, on December 24th. It will take a couple of weeks to reach Titan, where it will make the plunge on January 14. Huygens is expected to take 2-1/2 hours to make its descent through Titan's atmosphere, transmitting data all the way down. It may continue to transmit for another 30 minutes after making contact with the surface. At that time, Cassini will be about 44,700 miles away ready to receive data from Huygens and pass it on to Earth.

Huygens was built by the European Space Agency (ESA). It carries six instruments to analyze the atmosphere and its dynamics during its descent into the Titan atmosphere. If the probe survives the impact on the moon's surface, it will also analyze the environment around it.

Star Parties

January is too early for any major star party gatherings, but it's never too early to start planning your vacation time—especially for the Texas Star Party as their registration deadline is less than a week!

Texas Star Party — May 1-8, 2005
Near Fort Davis, Texas — www.texasstarparty.org

TSP 2005 Reservations will include both on-site and off-site attendees, so everyone will need to submit a TSP Registration/Reservation Request Form, **before January 17, 2005** which will be processed through a random drawing in late January 2005. This drawing will also include the allocation of all accommodations on the Ranch (camping and covered housing).

Desert Sunset Star Party — May 4-8, 2005
Caballo Loco Ranch, 11 miles south of Three Points, AZ
chartmarker.tripod.com/sunset.htm

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Newsletter header image: Do you get the feeling you're being watched? This image is of a debris disk surrounding the star HD 107146, 88 light years away in Coma Berenices. Debris disks are composed of the shattered remnants of small bodies such as comets and asteroids that collided as they orbited the star. A similar, though much less dense, cloud of dust orbits our Sun.

Photo by: NASA, ESA, D.R. Ardila (JHU); D.A. Golimowski (JHU); J.E. Krist (STScI/JPL); M. Clampin (NASA/Goddard); J.P. Williams (UH/IfA); J.P. Blakeslee (JHU); H.C. Ford (JHU); G.F. Hartig (STScI); G.D. Illingworth (UCO-Lick) and the ACS Science Team

Calendar of Events

January 24, 2005, 7:30 p.m.

What: *Exploding Stars, Blazing Galaxies and Monstrous Black Holes: The Extreme Universe of Gamma-ray Astronomy*
Who: Dr. Lynn Cominsky (Sonoma State Univ.)
Where: Kanbar Hall, Jewish Community Center, S.F.
Cost: $4.00

Images and data from NASA's Compton Gamma-ray Observatory will demonstrate the exotic phenomena seen in the Universe at gamma-ray energies. Also, new results from the Swift gamma-ray burst explorer, launched in the fall of 2004, and information about the Gamma-ray Large Area Space Telescope (GLAST) project.

The Jewish Community Center is located at 3200 California Street at the corner of Presidio Avenue. Parking is available across the street for $1.25 per night. Parking in the Community Center's garage is $1.25 per half hour.

January 26, 2005, 7:00 p.m.

What: *Exploring the Lord of the Rings: Cassini at Saturn*
Who: Dr. Jeff Cuzzi (NASA Ames)
Where: Smithwick Theater, Foothill College
Cost: Free ($2.00 for parking)

Arrive early to locate parking. Parking is $2 (eight quarters). For more information, call (650) 949-7888.

After a seven-year journey, the Cassini spacecraft arrived at Saturn in July 2004, to start a four-year tour of the planet, its icy moons, and its vast ring system. In January, a probe from Cassini called Huygens will explore the haze-shrouded giant moon called Titan (the only moon in the solar system to have a thick atmosphere.) One of the world's experts on ring systems around planets, Dr. Cuzzi will describe the Cassini-Huygens spacecraft and the plans for this fascinating mission. He will highlight the most exciting results from the first few months of Saturn system exploration.

Cuzzi is a research scientist in the Space Science Division at NASA's Ames Research Center and serves as the Interdisciplinary Scientist for Rings & Dust on the Cassini-Huygens.

February 1, 2005, 6:00 - 7:30 p.m.

What: *Engineering the Ocean*
Who: Marcia McNutt (Monterey Bay Aquarium Research Institute)
Where: Spago, 265 Lytton Ave., Palo Alto
Cost: Free (but seating is limited)

Dr. McNutt, an oceanographer who directs the Monterey Bay Aquarium Research Institute, will review some of the latest discoveries on issues such as how the ocean controls climate, what limits food production in the oceans, and what novel sources of energy lie in the deep sea. With this increased understanding will inevitably come pressures to re-engineer the oceans for the short-term benefit of mankind. Human exploitation of the land surface is rife with examples of environmentally damaging practices, cases in which mitigation of the damage was costly, time consuming, or impossible. Have we learned our lesson? What are some of the sociological, political, economic, and environmental challenges we will have to overcome before we can do any better with the ocean?

Registration will open Mid-January. www.cafescipa.org.

RTMC May 27-29, 2005
Riverside, California www.rtmcastronomyexpo.org

The Riverside Telescope Makers Conference and Astronomy Expo (RTMC) is held at the YMCA Camp Oakes, five miles southeast of Big Bear City

The theme for 2005 is "The History of Astronomy." Registration materials and online registration should be available in February 2005.

Shingletown Star Party July 6-11, 2005
Shingletown, California www.shingletownstarparty.org

The Shingletown star party takes place on an abandoned airstrip about 35 miles east of Redding. The town is quite supportive of this star party and helps host Public Night with a BBQ, live music, raffles, and a public star party.

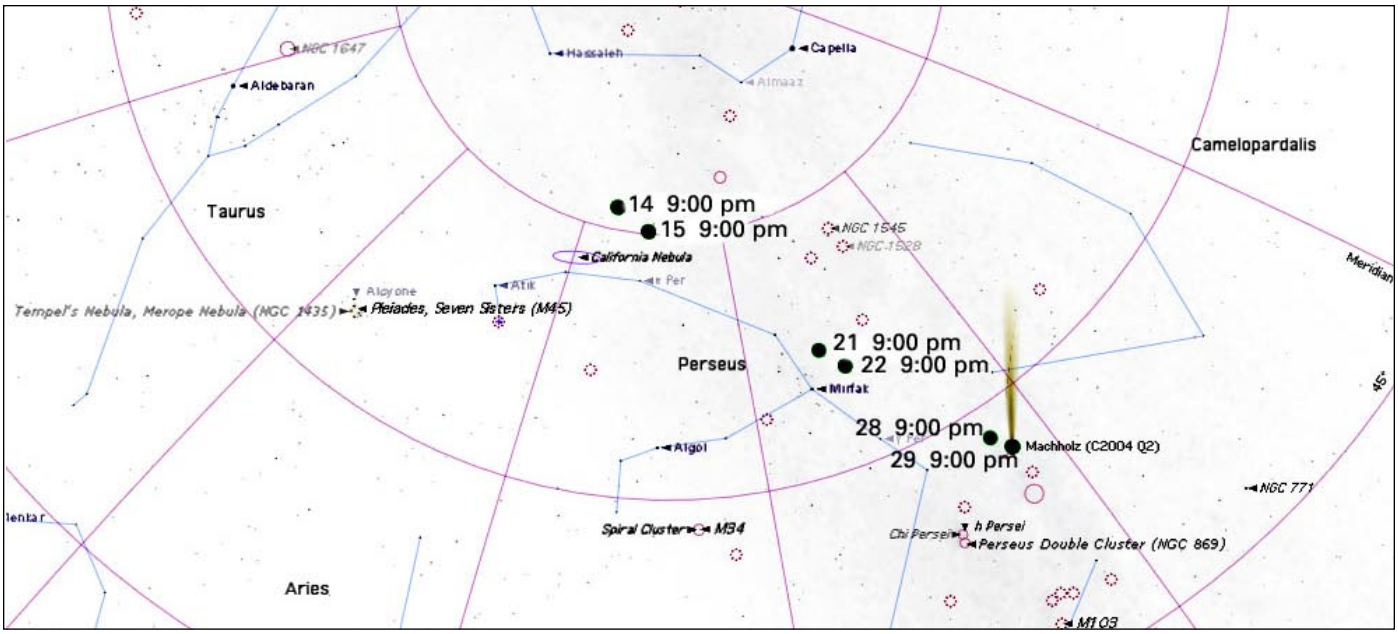
Attendance is limited to 300. There is a daily fee. Prices vary depending on how many days and when registration is made.

The TVS trips to Yosemite and the White Mountains have yet to be scheduled. Traditionally, they take place during the summer months.

Comet Machholz

Has anyone seen the comet with the unaided eye from the Bay Area? A sighting had been reported at the Chabot Space and Science Center the last week of December, but since then we have had nothing but clouds and rain. The photo op we were hoping for of the comet passing by the Pleiades was hidden from view from Bay Area observers. Fortunately, other places in the world had better weather than us, so we can see what we missed.

Below is a map showing the comet's position for the next month. Above right, what was visible above the clouds



We Have A Winner!

The Oceanside Photo & Telescope store had an "Astronomer's Fantasy Weekend" contest. The had over five thousand entries. The grand price winner won a trip to the Observers Inn in Julian, California. The first place winner was our very own **Gary Steinhour**. Gary won a Meade ETX-90AT with Autostar controller, valued at $600. Congratulations Gary!

Membership Renewal Time

The TVS membership year runs from January to December—which means it's time to renew! You'll find the membership form on the back of this newsletter. You can also download it off our web site.

The membership categories are:
Student (18 years old or younger) - $5
Basic - $25 (you download your copy of *Prime Focus.*)
Regular - $30 (you receive a paper version of *Prime Focus* in the mail.)

You can also subscribe to *Sky & Telescope* and/or *Astronomy* magazine at a discounted club rate - *S&T* is $32.95/year, *Astronomy* is $29/year.

For those who have held Patron membership in the past, we are still holding off collecting Patron dues until the Marling scope is back on line (which hopefully will be in a few months).

Green Laser Pointers

The green laser pointers amateur astronomers use have been in the news lately. During the first week of January, a New Jersey man was arrested for shining a green laser pointer at an airplane and helicopter. He was charged under the Patriot Act with interfering with a flight crew. He also was charged with lying to federal officers when he first told investigators that his young daughter was the one using the laser. He faces 25 years in prison and fines of up to $500,000.

There have been other reports of green lasers being pointed at aircraft in Oregon, Colorado, Ohio, Texas, and Washington. Because of these incidents, there is talk of banning the use of green lasers. Hopefully it won't come to that. For those who own these pointers, great care needs to be taken when using the pointers. The following are some pointers (no pun intended) on how to safely use green laser pointers.

- Never shine a laser pointer towards a person, animal, airplane, car, truck or other vehicle.
- Never look directly into the beam of the laser.
- Don't shine the laser on any reflective surface, as the reflection may harm someone's vision.
- When shining the laser in the sky, keep the beam as far away from any aircraft flying overhead, no matter what their altitude.
- Don't allow kids to play with the laser pointer. These pointers are much more powerful than red lasers and can do a lot of harm. They are not toys.
- If you use a green laser pointer as a finder for your scope, turn it off when not in use.

In other words, just use common sense.

Astronomical Insights

by David Feindel

Looking at the bottom of the cloudbank parked over the Tri-Valley is not interesting, whether through a telescope, binoculars, or naked eye. And we all know that clouds have been about the only target for almost three weeks now. The two days that weren't cloudy were limited by a hurricane-force jetstream (http://virga.sfsu.edu/crws/jetsream.html for an updated twice-daily map of the jetstream). When 2nd and 3rd magnitude stars start showing flashes of color from atmospheric diffraction, you know its not going to be a good night. I did manage to get a good look at Comet Machholz right after Christmas. The tails, though, weren't really visible from Pleasanton, either through my scope at 50x, or using 10x binoculars. But we all missed out on January 7 when it was in conjunction with the Pleiades. Various pictures from the internet merely served as teasers.

This month's book is clearly Antonín Rükl's *Atlas of the Moon*. I received a copy of the new 2nd edition for Christmas. It is fascinating. 76 maps show the near-side surface, each with 10-20 major features labeled and a brief description of who the feature is named for. The maps are done in blue "greyscale" (a major change from the original edition), to make it easier to see in red light. The detail is excellent; map 3 clearly shows 5 Plato craterlets. There are also 50 photos in the back, constituting a "greatest hits" section. I'm actually going to be anxiously waiting for the next quarter and three quarter moons this month!

The other astronomical highlights this month are Nova's *Welcome to Mars* show, chronicling the year of data we've gotten from Spirit and Opportunity (see www.pbs.org/wgbh/nova/mars and follow some links for a schedule when it will be broadcast again; originally aired January 4). The other highlight will be January 14th, when Huygens is scheduled to make its descent onto Titan. NASA's website www.nasa.gov/mission_pages/cassini/main/index.html for links to a live broadcast starting at midnight, January 14th. Huygens is scheduled to enter Titan's atmosphere around 3 a.m. PST on January 14, and first images back between 2 and 3 p.m.

What's Up *by Debbie Dyke*

All times Pacific Standard Time unless otherwise noted.

January

10 Mon **New Moon** 4:03 a.m.
Moon at perigee (221,073 mi) 2:10 a.m. Large tides expected. Closest lunar approach until 2008.

12 Wed Jupiter 2.5° S. of Moon 5:00 a.m.
Venus and Mercury just 20' away from each other low in the eastern predawn skies at 7:00 a.m.
Uranus 4° from the Moon as they both set in the west. 7:00 p.m.

13 Thur Mercury and Venus 9' from each other in the predawn southeastern sky. 7:00 a.m.
Saturn at opposition. 3:00 p.m.
1610 Galileo discovers Ganymede.

16 Sun **First Quarter Moon** 10:57 p.m.

19 Wed Moon 3.5° from the Pleiades (M45). 8:00 p.m.

20 Thur 1930 Buzz Aldrin born.

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

23 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.
Saturn 5° from the Moon. 9:00 p.m.

24 Mon **Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.
1986 Voyager 2 flyby of Uranus.

25 Tues **Full Moon** 2:32 a.m. The Beehive Cluster (M45) is 5° away.

27 Thur 1967 Apollo 1 capsule catches fire while sitting on launch pad, killing all three astronauts on board.

28 Fri 1986 Space Shuttle Challenger explodes soon after liftoff, killing all seven on board.

31 Mon Jupiter just 1° from the Moon. 1:00 a.m.
1958 The first U.S. satellite, Explorer 1, is launched.

February

1 Tues **Last Quarter Moon** 11:27 p.m.
2003 Columbia breaks apart during reentry, killing all seven on board.

3 Thurs Neptune in conjunction with the Sun. 11:00 a.m.
1966 First soft landing on Moon by the Soviet spacecraft Luna 9. Luna returns the first pictures of the surface of the Moon.

4 Fri 1906 Clyde Tombaugh (discoverer of Pluto) born.

5 Sat 1970 Apollo 14 lands on the Moon at Fra Mauro.

6 Sun **Full Moon** 12:47 a.m.
1971 Alan Shepherd (Apollo 14) is the first (and only) person to play golf on the Moon.

7 Mon Moon at perigee (222,310 mi). 2:00 p.m. Large tides expected.
1984 First untethered spacewalk performed by astronauts Bruce McCandless and Robert Stewart.
1889 The Astronomical Society of the Pacific is formed.

8 Tues **New Moon** 2:28 p.m.
1677 Jacques Cassini born.

9 Wed Kung (Gung) Hei (Hay) Fat Choy! Today starts Year 4702, the Year of the Rooster, in the Chinese Lunar calendar.

NASA's Space Place

Antennas, Designed by Darwin

by Patrick L. Barry

Who in their right mind would design this bizarre-looking antenna? Actually, nobody did. It evolved.

Taking a cue from nature, NASA engineers used a kind of "artificial evolution" to find this design. The result may look odd, but it works very well.

"The evolutionary process improves the design of antennas, just as evolution in nature leads to fitter plants and animals," says Jason Lohn, leader of the Evolvable Systems Group at NASA's Ames Research Center.

The improvement comes from Darwin's idea of natural selection: only the fittest members of a generation survive to produce offspring. Over many generations, traits that hinder survival are weeded out, while beneficial traits become more common. "In the end," he says, "you have the design equivalent of a shark, honed over countless generations to be well adapted to its environment and tasks."

Evolutionary computation, as it's called, applies this principle to hardware design. It's particularly useful for tackling problems that are difficult to solve by hand—like the design of new antennas.

Designing a new antenna for NASA's Space Technology 5 (ST-5) mission was the challenge facing Lohn's group. ST-5 will explore how TV-sized "nano-satellites" can perform the tasks of much larger, conventional satellites at a cheaper cost. Antennas on these satellites must be smaller than usual, yet capable of doing everything that a bigger antenna can do.

The evolution of this bizarre-looking antenna happened inside a computer. Many random designs were tested in a computer simulation. The computer judged their performance against certain goals for the design: efficiency, a narrow or wide broadcast angle, frequency range, and so on.

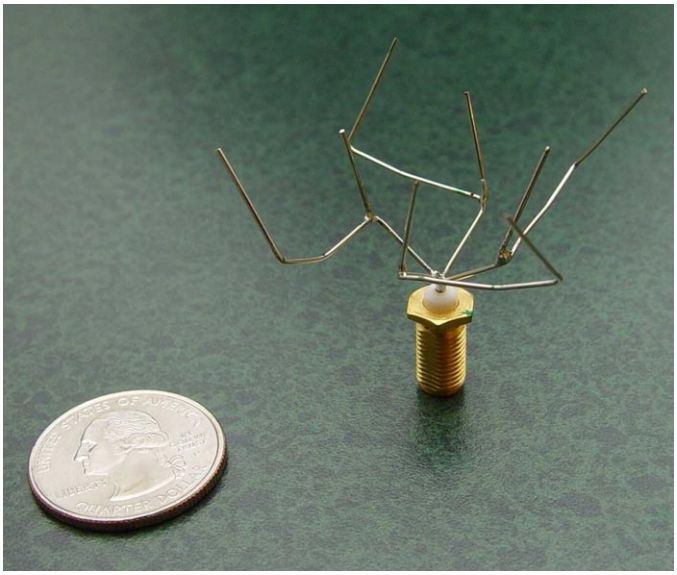
As in nature, only the best performers were kept, and these served as parents of a new generation. To make the new generation, the traits of the best designs were randomly mixed by the computer to produce fresh, new designs—just as a father and mother's genes are mixed to make unique children. This new generation was again tested in the computer simulation, and the best designs became the parents of yet another generation.

This process was repeated thousands, millions of times, until it settled onto an optimal, shark-like design that wouldn't improve any further. With today's fast computers, millions of generations can be simulated in only a day or so.

The result: an excellent antenna with an odd shape no human would, or could, design.

For more about artificial evolution, see ic.arc.nasa.gov/story.php?sid=86&sec. For more about Space Technology 5, see nmp.nasa.gov/st5. For an animation that helps explain to kids how ST5's antenna sends pictures through space, go to spaceplace.nasa.gov/en/kids/st5xband/st5xband.shtml.

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



The next generation antenna.

Astro Events

Comet Machholz as seen during the week before Christmas. This was a 20-minute exposure on 400 ISO slide film.
Photo by: Conrad Jung

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.
_____ $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 One year subscription to *Sky & Telescope* magazine.
_____ $29 One year subscription to *Astronomy* magazine.
_____ $55 Two year 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.