

# PRIMEFOCUS

Tri-Valley Stargazers

December 2012



## Meeting Info

### What:

Holiday Potluck Dinner

### Who:

You, family, and friends

### When:

December 21, 2012  
Doors open at 6:30 p.m.  
Dinner at 7:00 p.m.

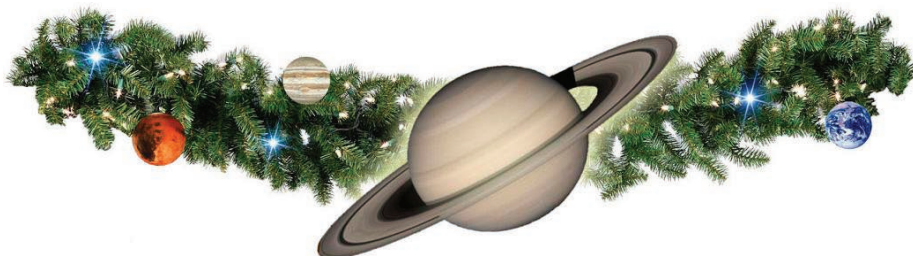
### Where:

Unitarian Universalist  
Church in Livermore  
1893 N. Vasco Road

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## December Meeting



## Holiday Potluck Dinner

This month is our Holiday/Christmas/Hanukkah/Kwanzaa/Winter Solstice/chant for more daylight/etc. potluck dinner. We'll be opening the doors at 6:30 to set up the tables and chairs, and then the feast will begin at 7pm. TVS will provide the drinks and paper/plasticware. Members are asked to bring a dish to share, and of course bring family and friends to share in the festivities. Based on the first letter of your last name members are asked to bring a dish to share: A-F: Vegetable or Fruit Dish; G-L: Dessert; M-R: Main Dish; S-Z: Rice or Potato Dish.

## Dues Are Due

TVS' membership year runs from January to December, so now is the time to renew your membership. Our membership rates remain unchanged from last year, as do the subscription rates for *Astronomy and Sky & Telescope*. We no longer offer the "Regular" membership level since we do not send out printed copies of the newsletter. Rather, at the "Basic" membership level we contact you via e-mail to let you know that a .pdf of the newsletter is available. The renewal form can be found on the back of this newsletter or on our website under the Membership link. Please make our Treasurer's New Year especially wonderful by sending in your renewal today.

## Royal Astronomical Society of Canada (RASC) Handbooks and Calendars Available for Purchase

The club now has RASC Handbooks and Calendars available for purchase. According to the website <http://www.nova-astro.com/handbook/> the 2013 edition of the handbook is bundled with the *Earth Centered Universe* Planetarium Software (<http://www.nova-astro.com/handbook/2013.html>). This free software will function through March 31, 2014 and will not perform predictions for events later than December 31, 2014. Prices are the same as last year: \$25 for the Handbook and \$17 for the Calendar. See David Feindel for purchases, or contact him via e-mail ([feindel@comcast.net](mailto:feindel@comcast.net)) to arrange to pick up Handbooks and/or Calendars if you can't attend the meeting. For more information on the handbook and calendar, see <http://www.rasc.ca/handbook/> and <http://www.rasc.ca/calendar>

## News & Notes

### 2012/2013 TVS Meeting Dates

The following lists the TVS meeting dates for 2012/2013. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting.

Lecture Meeting	Board Meeting	Prime Focus Deadline
Dec. 21	Dec. 17	
Jan. 18	Jan. 22	Dec. 28
Feb. 15	Feb. 18	Jan. 25
Mar. 15	Mar. 18	Feb. 22
Apr. 19	Apr. 22	Mar. 29
May 17	May 20	Apr. 26
Jun. 21	Jun. 24	May 24
Jul. 19	Jul. 22	Jun. 28
Aug. 16	Aug. 19	Jul. 26
Sep. 20	Sep. 23	Aug. 30
Oct. 18	Oct. 21	Sep. 27
Nov. 15	Nov. 18	Oct. 25
Dec. 20	Dec. 23	Nov. 29

### Money Matters

Treasurer David Feindel indicates that as of November 16, 2012 the TVS account balance is:

Checking \$11,857.26

### TVS Election Results

The 2012 officers were unanimously re-elected to another term in office. Their many years of service to the club are greatly appreciated.

## Journal Club by Karen Harris and Ken Sperber

### Now and Then (Part 1)

As we wind down 2012 and start planning for 2013, it is an excellent time to reflect on the past while keeping an eye on the future of astronomy. One way to do so is by visiting observatories - built by visionary men and women of the past, utilized, maintained, and supported by people looking out for the future.

This article highlights some observatories I had the pleasure of visiting over the last few years. These are presented in "First Light" chronological order. You are invited to share your own recollections and impressions regarding observatories you have toured or visited, for publication in the January 2013 Prime Focus.

#### Melbourne Observatory, Australia – 1869

History: The original aim of the Observatory was multipurpose – celestial observations, but also time standardization,

assisting in shipping and transportation, and predicting local weather. The 1873 additions of the South Equatorial building and the Photoheliograph house were specifically for observation of the 1874 and 1882 Venus transits, the last Earth-visible transits since the ones we just had in 2004 and this year.



Caption: Observing the Moon at the Melbourne Observatory using the 12 inch Newtonian. Image Credit: Karen Harris

#### James Lick Observatory, Mt. Hamilton, CA – 1888

History: The story of James Lick himself is highly interesting and worth a column all its own. The one-sentence summary is this: He started his career as a carpenter/cabinetmaker, later adding piano-maker to his trades, and moved from Pennsylvania to Argentina to Chile to Peru and finally to San Francisco (and invited Domingo Ghirardelli to come up from Peru and bring his chocolates), invested in land in what would later grow to be the center of San Francisco.

When his health took a serious turn for the worse, Lick began considering what he might leave as a lasting monument to his legacy. His friend, George Davidson, who was also President of the California Academy of Sciences, persuaded Lick to build an observatory (instead of the more audacious structures Lick had been considering). Lick died in 1876, and it was left to his Board of Trustees to select the site, telescope, scientists and engineers, and other details to bring the project to fruition. After much debate, planning, manpower, horsepower, 19 attempts by the French glassmaker House of Feil to re-construct the telescope's lens, and a with little luck – ten years after his death, James Lick was interred under the base of the 36-inch refractor telescope in the Great Dome atop Mt. Hamilton, near the conclusion of its construction.

**Header Image:** Arp87 as imaged by the Hubble Space Telescope in February 2007. Arp87 is a pair of interacting galaxies that are located approximately 300 million light years away. For more information see: [http://heritage.stsci.edu/2007/36/fast\\_facts.html](http://heritage.stsci.edu/2007/36/fast_facts.html)

## Journal Club (continued)



Caption: The 36 inch refractor at Lick Observatory. Image Credit: Karen Harris

Here is a quote from the Lick Observatory website ([http://collections.ucolick.org/archives\\_on\\_line/bldg\\_the\\_obs.html](http://collections.ucolick.org/archives_on_line/bldg_the_obs.html)) regarding first light:

“On a bitterly cold January night in 1888, the telescope saw ‘first light.’ The lens had been carried from its place in the observatory safe and installed in the telescope on December 31, but stormy weather prevented observing until, on January 3, a break in the clouds provided the first chance to put nearly fifteen years of planning and hard work to the test. One can only imagine the shock and distress that the small party

in the dome must have felt when they found they could not focus the telescope—and their relief when it was discovered that an error in the estimate of the focal length had caused the tube to be built too long. A hacksaw was sent for and the tube unceremoniously shortened. The image of a “blazing red sun”—the bright star Aldebaran—came into focus.”

The museum rooms at Lick Observatory are worth visiting, also. There are observation notebooks, photographic plates, meteorites, and all fashion of things to awe and inspire.

### Griffith Observatory, Mt. Hollywood, CA – 1935

History: Griffith J. Griffith, a speculator in silver and real estate, made his fortune in Mexico and the Los Angeles area in the latter part of the 19th century. Believing that Los Angeles should have a public park similar to those in Europe, and also believing (after looking through a 60-inch telescope at Mt. Wilson) that the world would be a changed place if every person could look through a telescope at the stars, Griffith decided to donate to the City of Los Angeles just such a park. The park would include an Observatory, Greek Theatre, and Exhibition Hall for free public use. (The Planetarium was invented after Griffith’s death, and included in the park plans.) Specifications were laid forth in Griffith’s Will along with the monetary bequest. A team of engineers and scientists, including George Ellery Hale, were assembled to assist with the planning and construction of the observatory. Russell Porter, instrument designer for Hale, selected the 12-inch Zeiss refracting scope for Griffith Observatory. In 1935, 16 years after the death of its visionary benefactor, Griffith Park was completed and Griffith Trust turned the park over to the City of Los Angeles. It has remained in public trust ever since.

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#### **Officers**

##### **President:**

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#### **AANC Representative:**

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#### **Historian:**

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#### **Mentor:**

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rushford@eyes-on-the-skies.org

#### **Refreshment Coordinator:**

Laurie Grefsheim

#### **Web & E-mail**

[www.trivalleystargazers.org](http://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](http://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 ([trivalleystargazers@gmail.com](mailto:trivalleystargazers@gmail.com)) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.



## Journal Club (continued)

### Palomar Observatory, San Diego, CA – 1948/1949

History: George Ellery Hale worked on the construction and operation of Mt. Wilson Observatory and advised on the construction of the telescope and observatory at Griffith Observatory, but was growing dissatisfied with the light pollution in the Los Angeles area. In 1930, he began searching for a more isolated location for a 200-inch telescope. He finally settled on Mt. Palomar in north San Diego County, and armed with a \$6M grant from the International Education Board (Rockefeller Foundation), construction begins on the 200-inch scope and observatory, to be administered by the newly formed CalTech.

One of the things I found most amazing about the history of this observatory was the ingenuity of the engineers and astronomers in recognizing an alternative use for the recently discovered glass blend called Pyrex. Hale himself had led the search for new material that could be used to create the 200-inch mirror. The Corning Glass Works Company in New York was able to cast the disc by the 2nd attempt, and it was transported by special train to California, where the mirror was ground, polished, and finished at CalTech's optics lab.

From 1941 through 1944, all work on the observatory and telescope ceased. Engineers, scientists, civilians, transportation, and other resources were harnessed for the efforts in World War II. Although telescope work resumed toward the end of 1944, many previous workers did not return, so the work was further slowed by new workers having to learn the processes. The 200-inch scope, which had been dedicated the year before to George Ellery Hale (d. 1938), saw first light in January 1949, as one of the smoothest riding domes ever built swung open to the night sky.

### Kitt Peak National Observatory, Tucson, AZ – 1958

History: Kitt Peak is just 56 miles southwest of Tucson and at an altitude of 6,880 feet - on land leased from the Tohono O'odham (pronounced: to HO no AH tomb) Nation.

Says Roy Cook of the O'odham: "Traditionally the O'odham watch the stars and when the Pleiades cross the sky in one night, that is the proper time for story telling. These nights are the longest of the year. The stories are told for four nights, traditionally by groups of two, one telling the story and one assisting him. There is an often-told Tohono O'odham story that describes the Milky Way as spilled tepary beans a coyote stole and dropped as he ran away." Similarly, Native Americans in the southern hemisphere used the Pleiades to guide them in planting and harvesting. The "subvisual high cirrus clouds" affected the apparent brightness of the Pleiades. According to an article by Benjamin Orlove, John Chiang and Mark Cane, the Andean indigenous peoples as early as the 1400s were using visibility of the Pleiades in December and June as well as other signs to predict summer

rainfall and inform on the bounty of autumn's harvest.

The Tohono O'odham were originally reluctant to lease land atop their sacred mountain. However, when the tribal elders were invited to look through a telescope at Steward Observatory and marveled at what they saw, they agreed to lease the land, but limited usage to astronomical research only.

[http://www.californiaindianeducation.org/science\\_lab/indian\\_stars.html](http://www.californiaindianeducation.org/science_lab/indian_stars.html), [http://www.isse.ucar.edu/signal/14/articles.html#article\\_05](http://www.isse.ucar.edu/signal/14/articles.html#article_05), Abstract re Orlove, B.S., J.C.H. Chiang, and M.A. Cane, 2000: Forecasting Andean rainfall and crop yield from the influence of El Niño on Pleiades visibility. *Nature*, 403, 68-71. [http://www.noao.edu/outreach/kptour/kpno\\_tohono.html](http://www.noao.edu/outreach/kptour/kpno_tohono.html)

### Mauna Kea Observatories, Hawai'i – 1968

History: Linking astronomy in Arizona with Hawai'i is Dr. Gerard Kuiper. After determining that Mauna Kea possessed ideal observing conditions (isolation in the middle of the Pacific with little light pollution and with over 300 ideal observing nights per year), Dr. Kuiper along with others of University of Arizona, University of Hawai'i, and Harvard University petitioned NASA for telescope funding. 1968 saw the completion of the first telescope atop Mauna Kea -- the UH 2.2m scope. Road construction, ground leveling, and the installation of other telescopes quickly followed.



Caption: Subaru and the 2 Keck's atop Mauna Kea. Image Credit: Karen Harris

Mauna Kea has deep-rooted cultural and religious significance to Hawaiians. Being the highest point in the Hawaiian Islands, Mauna Kea was believed to be the point at which the Earth and sky meet and the point of origin for all things earthly. It had also been used as a burial ground for some of the ali'i (royalty). Starting in the 1980s, the scientific community met with much resistance from the Hawaiian people

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regarding further leveling, development, and disturbance of the mountain summit. (The Hawaiian people felt tricked and betrayed regarding the use of their mountain top since the native Hawaiian community had not been consulted beforehand.)

Although the stars have long served as navigation tools to the seafaring Hawaiian people and there were obvious benefits to having astronomy observatories on Mauna Kea, there needed to be some amount of compromise and much more cultural sensitivity before the mountain could serve the needs of both. Although there is still some struggle and conflict between a few in the Hawaiian community and Hawaii lawmakers regarding usage of Mauna Kea (and also Haleakala on neighboring Maui), peaceful coexistence and respect for the land and each other have prevailed over the last few decades.

### Conclusion

Visiting observatories is one way of staying connected with those who came before with their vision, expertise, tremendous efforts and teamwork, tenacity and perseverance - not just for themselves in their time, but for future generations as well. It is with humility and gratitude we examine how far we have come; it is inspirational and exciting to see how much farther we have yet go.

Other sources: <http://www.griffithobs.org/obshist.html>, <http://www.laparks.org/observatory/exhibits/bzeiss.html>, <http://www.astro.caltech.edu/palomar/history.html>, [http://www.nps.gov/history/history/online\\_books/butowsky5/astro4e.htm](http://www.nps.gov/history/history/online_books/butowsky5/astro4e.htm)

Next month's column will discuss the future direction of these observatories.

## Calendar of Events

### December 22, 6:15am and 9:00am

What: Sunrise Hike  
Who: Guided Hike  
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619  
Cost: \$10 does NOT include General Admission, Space is Limited. Advanced registration is highly encouraged. Tickets available online or by calling (510) 336-7373

Welcome the new calendar cycle with a Sunrise Hike! Hike through the redwoods on a moderately strenuous 4-5 mile hike. Hike will take place rain or shine. Meet at the Center at 6am.

See <http://www.chabotspace.org/events.htm> for more

information.

### December 22, 10:00am-7:00pm

What: Begin the Baktun!  
Who: You  
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619  
Cost: Included with General Admission

Chabot celebrates the end of the Maya calendar cycle and start of a new Baktun. Explore the relationship of astronomy in Maya culture with a full day of festivities including, screenings of our planetarium show Tales of the Maya Skies and a Q&A session with the producer and director, a café conversation, dance performances, a sunrise hike, and Maya cuisine.

See <http://www.chabotspace.org/events.htm> for more information.

### December 28, 5:00pm

What: Night Hike  
Who: Guided Hike  
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619  
Cost: \$10 does NOT include General Admission, Space is Limited. Advanced registration is highly encouraged. Tickets available online or by calling (510) 336-7373

Hike through the redwoods in twilight and moonlight on a moderately strenuous 4-5 mile hike. Trail walks are led by an experienced hiker and Chabot educator and feature discussions about the natural environment and events and objects in the sky. Hike will take place rain or shine.

See <http://www.chabotspace.org/calendar.htm?date=12-9-2011&p=1439357> for more information.

### January 8, Noon-1:00pm

What: The atmospheric circulation of Pluto and Triton as predicted by a general circulation model  
Who: Angela Zalucha, SETI Institute  
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountainview  
Cost: Free

A variety of previous studies have investigated the 1D vertical temperature-pressure profiles of Pluto and Triton's atmospheres, while another class of models has investigated the bulk north-south transport of volatiles on these worlds. However, only recently have modern, 3D general circulation models (GCMs) been applied to Pluto and Triton.

GCMs are global models that solve for the primitive equations of the atmosphere and surface simultaneously, and can be used to predict surface, subsurface, and atmospheric

## What's Up by Ken Sperber (adapted from The Year in Space and S&T)

All times Pacific Standard Time.

### December

- 17-18 Mon- Ceres at opposition (visible all night; see p.50 December S&T)
- 19 Wed **First Quarter Moon, Uranus 5 degrees south of Moon (9:19am)**
- 21 Fri Winter Solstice (3:12am)
- 22 Sat Ursid Meteor Shower
- 23 Sun Ursid Meteor Shower, Venus 6 degrees north of Antares (pre-dawn)
- 25 Tue Jupiter 0.4 degrees north of Moon, Moon at apogee
- 28 Fri **Full Moon (2:21am)**

### January

- 2 Wed Earth at perihelion
- 3-4 Thu- Quadrantid meteor shower (predawn)
- 4 Fri **Last-Quarter Moon (7:58am)**
- 5-6 Sat- Moon close to Spica (5th) and Saturn (6th) (pre-dawn)
- 10 Thu Venus close to the crescent Moon (pre-dawn)
- 11 Fri **New Moon (11:44am)**
- 12-13 Sat Mars near the crescent Moon (30-60 minutes after sunset)
- 20 Sun Algol at minimum brightness for ~2 hours centered on 9:48pm

## Calendar of Events (continued)

temperature; atmospheric pressure; the three components of atmospheric flow; and surface ice thickness and extent in a physically consistent way. Most importantly from a meteorological standpoint, is that GCMs are the best tool for predicting atmospheric circulation, since this property is difficult to measure remotely.

Dr. Zalucha will discuss the results from one such Pluto/Triton GCM based off of the Massachusetts Institute of Technology GCM dynamical core.

For more information see: <http://www.seti.org/csc/lectures>, e-mail [info@seti.org](mailto:info@seti.org), or phone 650-961-6633.

### January 15, 7:00pm

What: The Sentinel B612 Telescope - Finding Asteroids Before They Find Us

Who: Ed Lu

Where: SETI Headquarters, 189 N. Bernardo Ave., Mountainview

Cost: Free

We know how to deflect asteroids, but our technology is useless if we do not scan the skies to look for asteroids to know well in advance if one is on a collision course with Earth. The Sentinel Space Telescope, the first privately supported deep space mission, is designed to do just that and to enable humanity to protect our planet from future asteroid impacts. Sentinel is an infrared space telescope to be placed into solar orbit in 2017 from where it will find and track asteroids that threaten Earth. It will discover more asteroids each month than the total discovered by all other telescopes combined up until the present. In addition to becoming one of the humanity's great scientific instruments, Sentinel will be unique in that its main purpose is actually to protect the Earth.

For more information see: <http://www.seti.org/csc/lectures>, e-mail [info@seti.org](mailto:info@seti.org), or phone 650-961-6633.



## It Takes More Than Warm Porridge to Make a Goldilocks Zone

By Diane K. Fisher

The “Goldilocks Zone” describes the region of a solar system that is just the right distance from the star to make a cozy, comfy home for a life-supporting planet. It is a region that keeps the planet warm enough to have a liquid ocean, but not so warm that the ocean boils off into space. Obviously, Earth orbits the Sun in our solar system’s “Goldilocks Zone.”

But there are other conditions besides temperature that make our part of the solar system comfortable for life. Using infrared data from the Spitzer Space Telescope, along with theoretical models and archival observations, Rebecca Martin, a NASA Sagan Fellow from the University of Colorado in Boulder, and astronomer Mario Livio of the Space Telescope Science Institute in Baltimore, Maryland, have published a new study suggesting that our solar system and our place in it is special in at least one other way.

This fortunate “just right” condition involves Jupiter and its effect on the asteroid belt.

Many other solar systems discovered in the past decade have giant gas planets in very tight orbits around their stars. Only 19 out of 520 solar systems studied have Jupiter-like planets in orbits beyond what is known as the “snow line”—the distance from the star at which it is cool enough for water (and ammonia and methane) to condense into ice. Scientists believe our Jupiter formed a bit farther away from the Sun than it is now. Although the giant planet has moved a little closer to the Sun, it is still beyond the snow line.

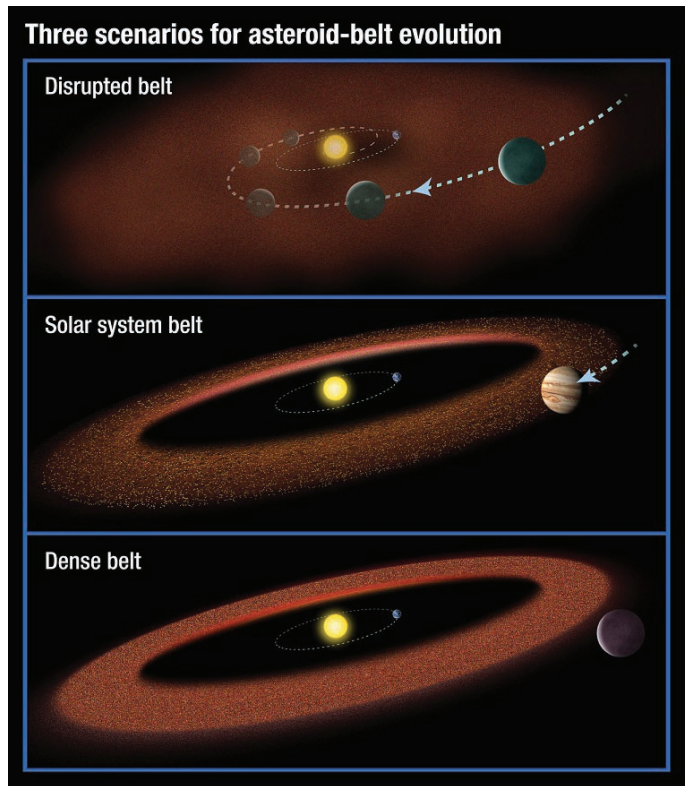
So why do we care where Jupiter hangs out? Well, the gravity of Jupiter, with its mass of 318 Earths, has a profound effect on everything in its region, including the asteroid belt. The asteroid belt is a region between Mars and Jupiter where millions of mostly rocky objects (some water-bearing) orbit. They range in size from dwarf planet Ceres at more than 600 miles in diameter to grains of dust. In the early solar system, asteroids (along with comets) could have been partly responsible for delivering water to fill the ocean of a young Earth. They could have also brought organic molecules to Earth, from which life eventually evolved.

Jupiter’s gravity keeps the asteroids pretty much in their place in the asteroid belt, and doesn’t let them accrete to form another planet. If Jupiter had moved inward through the asteroid belt toward the Sun, it would have scattered the asteroids in all directions before Earth had time to form. And no asteroid belt means no impacts on Earth, no water delivery, and maybe no life-starting molecules either. Asteroids may have also delivered such useful metals as gold, platinum, and iron to Earth’s crust.

But, if Jupiter had not migrated inward at all since it formed far away from the Sun, the asteroid belt would be totally undisturbed and would be a lot more dense with asteroids than it is now. In that case, Earth would have been blasted with a lot more asteroid impacts, and life may have never had a chance to take root.

The infrared data from the Spitzer Space Telescope contributes in unexpected ways in revealing and supporting new ideas and theories about our universe. Read more about this study and other Spitzer contributions at [spitzer.caltech.edu](http://spitzer.caltech.edu). Kids can learn about infrared light and enjoy solving Spitzer image puzzles at [spaceplace.nasa.gov/spitzer-slyder](http://spaceplace.nasa.gov/spitzer-slyder).

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



Caption: Our solar system is represented by the middle scenario, where the gas giant planet has migrated inward, but still remains beyond the asteroid belt.

Tri-Valley Stargazers  
P.O. Box 2476  
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## 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.
  - \_\_\_\_\_ \$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.
  - \_\_\_\_\_ \$34 One year subscription to Astronomy magazine.
  - \_\_\_\_\_ \$60 Two year subscription to Astronomy magazine.
  - \_\_\_\_\_ \$32.95 One year subscription to Sky & Telescope magazine. Note: Subscription to S&T is for new subscribers only. Existing subscribers please renew directly through S&T.
- \$ \_\_\_\_\_ 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.