PRIMEFOCUS
Tri-Valley Stargazers

August 2004

Meeting Info:

What
Kitt Peak Observatory's Advanced Observing Program

Who
Gert Gottschalk

When
August 20, 2004
Conversation at 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

Inside

August Meeting

Kitt Peak National Observatory's Advanced Observing Program

Gert Gottschalk

KPNO (Kitt Peak National Observatory) located near Tucson AZ is one of the United States' most prominent research sites on optical and microwave astronomy. Construction on the site began in 1958 after a contract was signed with the Tohono O'odham Indians who viewed Kitt Peak as a sacred place. To serve its role to the public, a visitor center was added to the observatory to inform the public about the research work performed and tools employed at the site. The visitor center offers exhibits, public tours and evening star viewing for interested people. For interested amateurs they have established a visitor's telescope which is used for guided tours as well as for all night observing runs. The exquisite site conditions are combined with a 20-inch telescope and CCD camera and visual observing equipment. I was able to make use of this equipment on a visit to Kitt Peak for two observing nights. In the presentation we will see an introduction to Kitt Peak observatory, its environment and its origins as well as the results of the amateur observing run on site.

If you are interested in participating in this program, visit their web site to learn more about the program and its costs: www.noao.edu/outreach/aop.

Left: Some of the Kitt Peak observatories. The dome in the middle houses the Mayall 4-meter telescope.
Right: Galaxy NGC 266, approximately 200 million light years away. Photo taken using the 20" f/8.4 RC Optical Systems telescope and a SBIG ST 10XME CCD camera with color filter wheel. Luminance = 90 minutes binned 1x1, Red = 20 minutes binned 2x2, Green = 20 minutes binned 2x2, Blue = 20 minutes binned 2x2.
Photos by: Gert Gottschalk

News & Notes

Welcome

TVS welcomes our newest members—**Hans Wiest** and **Rachael Buchanan**.

2004 TVS Meeting Dates

Below are the TVS meeting dates for the rest of the year. 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 September 5th deadline is for the September issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Aug 20	Aug 23	Aug 8
Sept. 17	Sept. 20	Sept. 5
Oct. 15	Oct. 18	Oct. 3
Nov. 19	Nov. 22	Nov. 7
Dec. 17	Dec. 20	Dec. 5

Money Matters

At the July Board meeting, Treasurer **Gary Steinhour** gave us the account balances (as of July 19, 2004) of TVS's accounts:

Checking	$2,096.33	
CD #1	$3,936.27	matures 08/17/04
CD #2	$2,429.22	matures 08/27/04
CD #3	$1,072.67	matures 10/16/04

Since the use of LCD projectors by speakers is on the rise, the board of directors has decided to invest in acquiring one for the club. This is a substantial purchase which will alter the above account balances.

H2O Open House — September 4

H2O is TVS's dark sky site. Members who pay a key deposit and who go through an orientation get to use the site throughout the year. For members who are trying to decide if they should become a key holding member, or non-members who would like to see what the club's site offers, can visit the site at any one of our open houses.

Our last open house of the summer observing season is on Saturday, September 4th. Meet at the corner of Mines and Tesla to caravan down to the site. The caravan departs the meeting site at 6:00 p.m. There is a $3 per car entrance fee (exact change).

Recently it has been reported that the skies at H2O have been darker than usual. Perhaps whatever is causing such conditions to occur will be in play again during the open house. Bring your scope or sneak peeks from someone else's scope. H2O is a primitive site, so plan accordingly.

Above: David Levy pauses during his talk at AstroCon 2004 to phone Walter Haas (founder of ALPO) with get well wishes. Walter was to be at the conference, but was stuck in a hospital in London recovering from a fall. Prior to his talk, David won a comet filter during a door prize give-away. *Photo: Conrad Jung.*

Below: President Chuck Grant meets Apollo 12 astronaut Alan Bean on board the USS Hornet. *Photo: Ron Bissinger.*

Newsletter header image: Group of Galaxies in Fornax

Hubble has taken a view of an eclectic mix of galaxies. The camera was taking a picture of a typical patch of sky, while Hubble's infrared camera was viewing a target in an adjacent galaxy-rich region. The most peculiar-looking galaxy in the image — the dramatic blue arc in the center — is actually an optical illusion. The blue arc is an image of a distant galaxy that has been smeared into the odd shape by a phenomenon called gravitational lensing.

Image Credit: NASA, ESA, J. Blakeslee and H. Ford (Johns Hopkins University)

Calendar of Events

August 14, 6:00 p.m.
What: *The Mechanics of Heaven: Jesuit Astronomers at the Qing Court*
Who: Mark Mir
Where: Chabot Space & Science Center
Cost: $5

While Europe was developing the telescope, Chinese astronomers were making impressive astronomical discoveries and taking highly accurate measurements of the heavens with instruments of their own. However, their science changed with the Jesuit missionary arrival in the 1500's. Mark Mir, of the Ricci Institute in San Francisco, will speak on Jesuit contributions to the field of Chinese astronomy, and how several were appointed to the court as Royal Astronomers.

August 19
What: *Astronomy Classes*
Who: Dr. Claire Chapin
Where: Merritt College, Oakland
Cost: Varies

Dr. Claire Chapin is an astronomy professor at Merritt College in Oakland. He is also a telescope volunteer at the Chabot Space and Science Center. If you've been wanting to take an astronomy course of some sort, here's your chance as he'll be teaching several.

Intro to Astronomy (Astro 1): Monday/Wednesday, 9:30-11:00 a.m.

Intro to Astronomy, Short Term Version: Friday nights and Saturdays, starting on September 17.

Descriptive Astronomy (Astro 10): Monday/Wednesday 12:00 - 1:30 p.m. and Wednesday nights from 7-10 p.m.

Observational Astronomy (Astro 20 and 11): Wednesday evenings.

You can enroll online at www.peralta.cc.ca.us or call 510-208-7225. For more info about the classes, contact Dr. Chapin at 510-434-3885 or cchapin@merritt.edu.

August 21, 8:00 p.m.
What: *Bad Astronomy: Facing Down the Face on Mars*
Who: Dr. Phil Plait (Sonoma State Univ.)
Where: Mt. Tam
Cost: Free

The recent spate of nonsense circulating the web involving the Red Planet will be debunked with science, simple logic and a dose of humor.

Some future astronomy programs (includes observing with the San Francisco Amateur Astronomers after the lecture):

September 18, 7:30 p.m.: Dr. Pascal Lee from the Mars Institute on *Humans on Mars*

October 16, 7:30 p.m.: Dr. Emma Bakes from the SETI Institute on *Exploring the Meaning of Life*

Future Storytelling Series:

October 23, 5:00 p.m.: Mary Ellen Hill's story *We are the Stars That Sing: The Story of the Universe*

Check out the Mt Tamalpais Interpretive Association web site: www.mttam.net or call 415-455-5370 for more information

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Rich Campbell

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Paul Caswell & Debbie Dyke

Mentor:
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rushford@eyes-on-the-skies.org

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Livermore, CA 94551

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*

August 27, 7:30 p.m.
What: *Lick Observatory Music of the Spheres*
Who: San Jose Chamber Players
Where: Lick Observatory
Cost: $40 Standard; $100 Preferred; $150 VIP

The San Jose Chamber Players, led by cellist Peter Gelfand, blend popular classic hits with classic pop hits.

The concert also includes a talk by Greg Laughlin, UCSC professor, who will discuss *Saturn—Storms, Rings, and Icy Moons*, as well as viewing through Lick's classic 36-inch refractor. For more info about Lick's Music of the Spheres series and its Summer Visitor Program, visit http://www.ucolick.org/public.

Tickets may be purchased from the UCSC Ticket Office by phone or in person. A handling fee of $1 per ticket, up to a maximum of $6 per order, will be charged. Tickets are non-refundable. For more information, visit the UCSC Ticket Office web site at http://events.ucsc.edu/ticket_how2buy.html.

August 27-28
What: *AstroImage 2004*
Who: Orange County Astronomers
Where: Curtis Theater, Brea CA
Cost: $49 Pre-Registration; $65 at the door (providing there is room available).

The Orange County Astronomers would like to invite you to attend AstroImage 2004 to be held on August 27-28 in Brea, CA. This year's conference features a terrific line up of speakers as well as vendor exhibits and equipment displays. There will also be a special Friday night session for people who are new to astroimaging, and the Saturday presentations promise to be informative and entertaining for both new and experienced imagers.

Some of the topics to be presented at the conference are: Color Balancing Astroimages, Getting to Print, Imaging With Digital Cameras, Using a Modified Digital Camera for Increased Sensitivity, Crossing Over From Film To Digital, and Ultrawidefield Film Imaging.

The are some flyers regarding the event that you can download from the OCA's web site. The official web site for the conference is: http://www.ocastronomers.org/astroimage/2004/index.asp.

Those interested in attending the conference can register on line through the web site. Anyone who has questions that are not covered on the web site can contact Garth Buckles at 714-879-2755.

First Light: Beginners' Astronomy

by Richard Campbell

STAR TRAVEL

For those of us who love to travel, *any* excuse will justify a new journey. There's a harvest festival in Germany! Ach du lieber! We must go now! Wildflower season in Nepal? We're there. The path of totality passes through Kenya in April. Book a me ticket!

Huh? Path of whattality?

The path of *totality* is actually a destination—a place on Earth where you can see a total solar eclipse. Intrepid "eclipse chasers" will literally travel to the ends of the Earth to see the sun's disk gradually disappear behind the moon's. As the eclipse is about to begin, the last glints of sunlight burst through the lunar craters in profile, forming a diamond ring-like structure called 'Bailey's Beads'. A shadow races toward you at hundreds of miles per hour. Some stars appear. When the eclipse truly begins, both the corona and fiery prominences stream outward in swirling tendrils of pearl and magenta. This fleeting event lasting mere minutes is so spectacular that attendees feel justified spending weeks to travel and witness it. If you attend a Tri-Valley Discussion meeting, ask your fellow stargazers if they have seen a total solar eclipse. If they have, they will regale you with an unforgettable story.

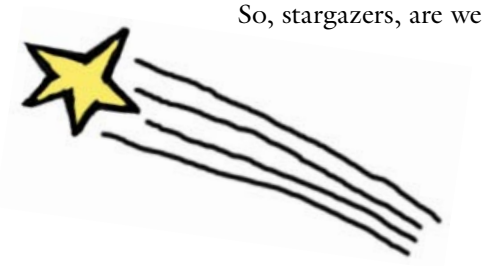
The other classic Astro Voyage covers a much wider path: the whole southern hemisphere of our planet. When you travel south of the equator, say to Chile or Australia, the best celestial sights appear:

1. The constellation Crux (the Southern Cross)
2. Omega Centauri, the largest globular star cluster visible from Earth
3. The core of our galaxy, floating overhead
4. Our companion galaxies, the Magellanic clouds.

I'll never forget hiking in Patagonia, Chile, and looking up at what appeared to be a hole in space. It was the Coal Sack, a super-black dusty nebula next to the Southern Cross. No such nebula exists in our northern skies. Near the Coal Sack sits the Jewel Box—a cluster of *multi-colored stars* shining ruby, sapphire and white hot. Even more amazing, it is powerfully surreal to look up at the night sky and find no familiar constellations. It honestly feels like you're on another planet. And all you have to do is travel half a planet to find it.

These experiences are not as inaccessible as they might seem. Chile is surprisingly affordable, especially in the off-season, and a total eclipse will visit California in 2017.

So, stargazers, are we there yet?



Astronomical Insights

by Caroline Feindel

David Feindel was not able to write a column for this month's issue of Prime Focus, so his daughter Caroline has taken over the reins and has whipped up the following. Thanks Caroline!

Every year my family and I drive up to Yosemite for the annual star-party hosted by the Tri-Valley Stargazers. Every year the whole group goes out to Glacier Point for two nights, where the skies never disappoint. Every year I never expect to be surprised by the viewing, or by Dave Rodrigues's Astro-Wizard presentation—and yet every year I always am.

The two-day party kicked off at Glacier Point with Dave's usual funny and educational routine ("Everybody say it with me: the Earth…is…8000…miles wide!") at around dusk. As the light faded from the park and Half Dome sank into shadow, the skies gave way to their usual incredibly clear assortment of stars, and people started to wander around the amphitheater, looking through our scopes. As usual, the interest was mostly on deep sky objects—M18, the Andromeda Galaxy, and the Whirlpool Galaxy were particular favorites, and were amazingly clear. The "oh wow!"s from children and adults alike made the cold bearable. The viewing was characteristically incredible, at least until moonrise around midnight. It was as amazing, if not more so, than any sunrise, watching the quarter moon leap over the horizon. Unfortunately it ruined our night vision and forced us to pack up for the night. By then it was cold enough that there were few complaints.

The following day was when we held our potluck. When the burgers and pasta salad had all disappeared it was time to head out to Glacier Point again. When we arrived we found that some of Yosemite's fauna had decided to crash the star-party—a mother bear and two cubs were investigating the amphitheater. It was worth the delay in setting up scopes to watch the trio sniff around the firepit for a few minutes. Once they wandered off it was safe to set up telescopes and Dave prepared for his presentation. An hour of so later Dave launched into his Astro-Wizard routine, a longer version than the previous day, but he lived up to his usual standards of talkativeness and humor.

Most of the unusually large crowd stuck around to look through telescopes. The Andromeda Galaxy and several nebulae including the Ring, Lagoon and Swan were the highlights of the early night. As the crowd started to shrink, the largest telescopes turned toward the Cat's Eye Nebula and the Little Dumbbell, neither of which I have ever seen before, and both of which were suitably incredible. The moon rose again around 12:30 just to the left of Half Dome, and was just as awe-inspiring as the previous night. As before, it was then too bright to continue viewing, so we packed up again and went back to camp.

The next day it was time to say farewell to the beautifully clear skies of Yosemite until next year. It's always something of a disappointment, seeing the skies above Pleasanton in comparison Yosemite's skies. My family and I of course intend to go back next year. One can only go so long without hearing Dave's joke about Saturn leaving "rings around the tub."

The Lagoon and Trifid Nebulas. This beautiful grouping of the two nebulas (Lagoon is on the right) was taken from Fremont Peak State Park (San Juan Bautista) using a 106mm Takahashi refractor at f/5, stacking two 15 minute hand guided exposures on Kodak E200 slide film pushed one stop, digitally scanned and enhanced using Photoshop. *Photo by: Ron Bissinger*

What's Up *by Debbie Dyke*

All times Pacific Daylight Time unless otherwise noted.

August

11 Wed Moon at apogee (251,291 mi/405,292 km) 3:00 a.m.

12 Thurs **Perseid meteors** peak at 4:00 a.m.

13 Fri Saturn 5° S of the Moon in the East just before sunrise.
Stellafane Convention in Springfield VT begins. The funs ends on the next day.

15 Sun **New Moon** 6:24 p.m.

17 Tues Venus at greatest elongation W (46°) 12:00 p.m.
Jupiter 3° S of the Moon at sunset.
1877 Asaph Hall discovers Mars' other moon, Phobos.

20 Fri **Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
1977 Voyager 2 launched toward Jupiter and Saturn.

21 Sat 1609 Galileo shows off his telescope to the Doge's navy.

22 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.

23 Mon **First Quarter Moon** 3:12 a.m.
Antares just 2.5° from the Moon in the evening.
Mercury at inferior conjunction.
Tri-Valley Stargazers Board meeting. 7:00 p.m. at the Round Table Pizza in Livermore.

25 Wed 1981 Voyager 2 flies past Saturn.
1989 Voyager 2 flies past Neptune.

26 Thurs Moon at perigee (226,365 mi/365,105 km) 11:00 p.m.

27 Fri **Full Moon** 7:22 p.m.
Uranus at opposition 12:00 p.m.

29 Sun 1864 William Hugging discovers that nebulae are gas clouds.

30 Mon 1983 Guion Bluford Jr. becomes the first African American in space.

31 Tues Pluto stationary 10:00 a.m.
Venus 2° S of Saturn (45° W) 4:00 a.m.

September

1 Wed 1979 Pioneer 11 is first craft to fly past Saturn.

3 Fri 1976 Viking 2 lands on Mars at Utopia Planitia.

4 Sat The Moon is just 2.5° from the Pleiades (M45) as they rise together in the East at 11:00 p.m.

5 Sun 1977 Voyager 1 launched toward Jupiter and Saturn.

6 Mon **Labor Day**.
Last Quarter Moon 8:11 a.m.

7 Tues Moon at apogee (250,767 mi/404,464 km) 8:00 p.m.

8 Wed 1966 Star Trek debuts. It's ranked 52nd out of 54 shows.

9 Thurs Mercury greatest elongation W (18°) 7:00 a.m. Look for it in the predawn skies.
Mercury 42' S of Regulus in the East at daybreak.
1975 Viking 2 launched towards Mars.

10 Fri In the east before dawn, look for the waning crescent Moon, Venus, Saturn, Castor & Pollux. Mercury will be close to the horizon.

NASA's Space Place

Waiting for Cassini's "Safe Arrival" Call

by Diane K. Fisher

The evening of June 30, 2004, was nail-biting time at Cassini Mission Control. After a seven-year journey that included gravity assist flybys of Venus, Earth, and Jupiter, Cassini had finally arrived at Saturn. A 96-minute burn of its main engine would slow it down enough to be captured into orbit by Saturn's powerful gravitational field. Too short a burn and Cassini would keep going toward the outer reaches of the solar system. Too long a burn and the orbit would be too close and fuel reserves exhausted.

According to Dave Doody, a Cassini Mission Controller at the Jet Propulsion Laboratory (JPL) in Pasadena, California, there was a good chance the Earth-bound Cassini crew would have to wait hours to learn whether or not the burn was successful. Of the three spacecraft-tracking Deep Space Network (DSN) complexes around the globe, the complex in Canberra, Australia, was in line to receive Cassini's signal shortly after the beginning of the burn. However, winds of up to 90 kilometers per hour had been forecast. In such winds, the DSN's huge dish antennas must be locked into position pointed straight up and cannot be used to track a tiny spacecraft a billion miles away as Earth turns on its axis. "The winds never came," notes Doody.

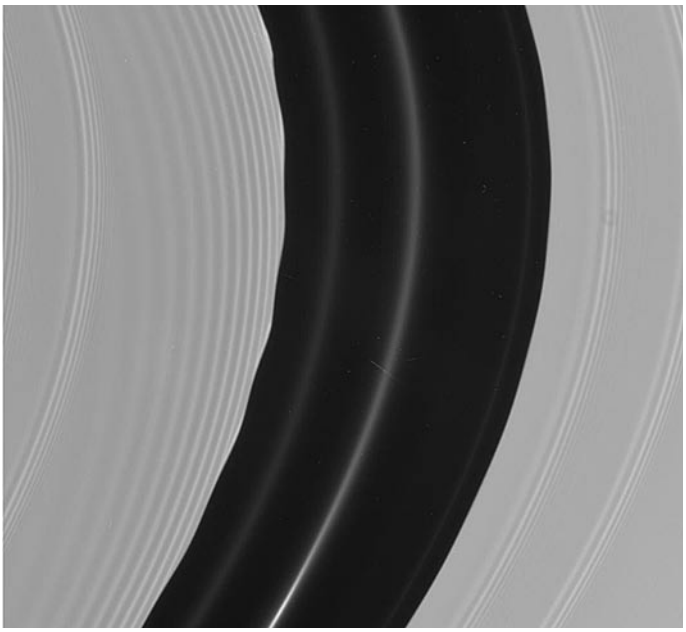
The DSN complex at Goldstone, California, was tracking the carrier signal from Cassini's low-gain antenna (LGA) when the telltale Doppler shift in the LGA signal was seen, indicating the sudden deceleration of the spacecraft from the successful ignition of the main engine. Soon thereafter, however, Goldstone rotated out of range and Canberra took the watch.

After completion of the burn, Cassini was programmed to make a 20-second "call home" using its high-gain antenna (HGA). Although this HGA signal would contain detailed data on the health of the spacecraft, mission controllers would consider it a bonus if any of that data were actually captured. Mostly, they just wanted to see the increase in signal strength to show the HGA was pointed toward Earth and be able to determine the spacecraft's speed from the Doppler data. If possible, they also wanted to try to lock onto the signal with DSN's closed-loop receiver, a necessary step for extracting engineering data. Normally it takes around one minute to establish a lock on the HGA signal once a DSN station rotates into range. Having only 20 second's worth of signal to work with, the DSN not only established a lock within just a few seconds, but extracted a considerable amount of telemetry during the remaining seconds.

"The DSN people bent over backwards to get a lock on that telemetry signal. And they weren't just depending on the technology. They really know how to get flawless performance out of it. They were awesome," remarks Doody.

Find out more about the DSN from JPL's popular training document for mission controllers, Basics of Space Flight (www.jpl.nasa.gov/basics) and the DSN web site at deepspace.jpl.nasa.gov/dsn. For details of the Cassini Saturn orbit insertion, see www.jpl.nasa.gov/basics/soi. Kids can check out The Space Place at spaceplace.nasa.gov/en/kids/dsn_fact1.shtml to learn about the amazing ability of the DSN antennas to detect the tiniest spacecraft signals.

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



Right after entering Saturn orbit, Cassini sent this image of the part of the Encke Gap in Saturn's rings. *Image credit NASA/JPL/Space Science Institute.*

News & Notes *continued*

Ursa Major stops by the TVS Star Party at Glacier Point. *Photo by: David Feindel*

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.