PRIMEFOCUS

Tri-Valley Stargazers

January 2003

TVS Tri-Valley Stargazers

Meeting Info:

What
What Your Astronomy Textbook Won't Tell You

Who
Norm Sperling

When
January 17, 2003
Conversation at 7:00 p.m.
Lecture at 7:30 p.m.

Where
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

Inside

January Meeting

"What Your Astronomy Textbook Won't Tell You"

Norm Sperling

Norm Sperling.

Norm Sperling has taught thousands of introductory astronomy students what their textbooks won't tell them. Some didn't get it. He's carefully probed the reasons why, and puts the best, student-proven ways to master astronomy into his new book, *What Your Astronomy Textbook Won't Tell You*.

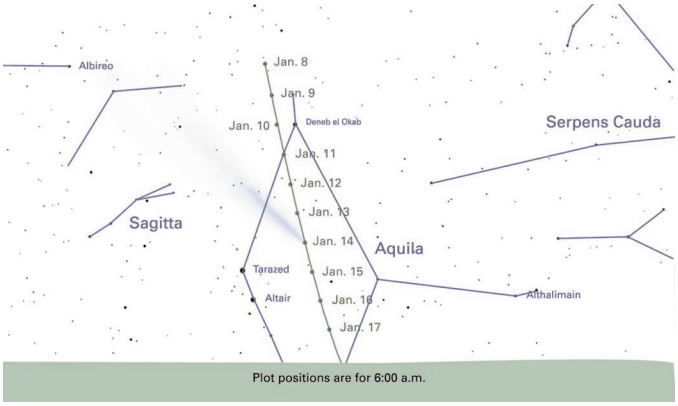
- ★ Too much jargon? Clarify the terms: Jupiter's "frozen gases" are either not frozen or not gases.
- ★ Outdated viewpoints? Reset your mindset to the latest issues. The debate about whether Pluto is a planet isn't about Pluto; experts no longer agree on what "planet" means.
- ★ Too sure of things? Learn which Unknowns still stump astronomers. What's inside stars? What do magnetic fields do?
- ★ Do you like a good detective story? Find out how the Northern Lights confounded evidence for the Loch Ness Monster.
- ★ Want fresh ideas and new angles? Find out why galaxies pictured in textbooks and magazines are NOT typical. And enter a contest to make selections fairer.
- ★ Enjoy ironies from the past? See why the Great Spiral Galaxy in Andromeda used to be classified as elliptical, and irregular.
- ★ Want to dodge a scam? Find out why you should beware of buying a star.
- ★ Too serious? Chortle at student boners…which point out mistakes to wisely avoid.

Norm Sperling was Science Editor at AltaVista.com, an editor of *Sky & Telescope*, and a planetarium director. He will sell copies of his book for $27. Autographing: free.

News & Notes

New Comet

A new comet was discovered last month and might just become a naked-eye object this month. Comet Kudo-Fujikawa (C/2002 X5) is visible in the morning sky just before sunrise near Aquila. You'll have to look soon, as it will soon disappear into the morning light.



2003 TVS Meeting Dates

Below are the next few TVS meeting dates. The lecture meetings are held on the third Friday of the month, with the Board meeting on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the February 9th deadline is for the February issue).

Lecture Meeting	**Board Meeting**	***Prime Focus* Deadline**
Jan. 17	Jan. 20	Jan. 5
Feb. 21	Feb. 24	Feb. 9
Mar. 21	Mar. 24	Mar. 9

Money Matters

At the December Board meeting, Treasurer **Gary Steinhour** reported the balances (as of December 16, 2002) of the following TVS accounts:

Checking	$1,616.78	
CD #1	$3,896.67	matures 02/17/03
CD #2	$2,404.78	matures 02/27/03
CD #3	$2,046.71	matures 01/16/03

Dues Are Due

Our membership year ended in December. If you wish to keep your *Prime Focus* delivered to your doorstep, or computer, without interruption renew now! For those who subscribe to *Sky & Telescope* or *Astronomy* magazine through the club, the sooner you renew, the less chance there is of missing an issue.

Science Fun Fair

Every year, TVS participates in the Pleasanton School District's Science Fun Fair. We could use some volunteers to bring their scopes to this event, which is expected to attract 12,000 people. It takes place on Thursday, February 20 from 5:30 to 9:00 p.m. at the Alameda County Fairgrounds in Pleasanton. Let President Chuck or Editor Debbie know if you are interested in helping.

RASC Handbooks

The RASC (Royal Astronomical Society of Canada) Observer's Handbook and Calendar are still available for purchase. The Handbook is $15, the Calendar $10 (and is in limited supply). If you'd like more information about these items, visit the RASC web site at www.rasc.ca and click on the 'Publications' link. If you wish to purchase one, or both, come to the January meeting and see our Treasurer **Gary Steinhour**.

Calendar of Events

Classic Sci-Fi Film Series

Chabot Space & Science Center

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

Movies:

2010 (PG), January 10-12
The Fifth Element, January 31-February 2
X-Men: The Movie, March 7-9

Showtimes:

Friday – Sunday on the first weekend of each month.

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

Newsletter header image: NGC 1999, a reflection nebula, lies close to the famous Orion Nebula, about 1,500 light-years from Earth. It was discovered two centuries ago by Sir William Herschel and his sister Caroline.

The nebula is illuminated by a bright, recently formed star (V380 Orionis), visible in the photo just to the left of center. The dark cloud seen is a "Bok globule". The globule is a cold cloud of gas, molecules, and cosmic dust, which is so dense it blocks all of the light behind it. Astronomers believe that new stars may be forming inside Bok globules, through the contraction of the dust and molecular gas under their own gravity.

These data were collected in January 2000 by the Hubble Heritage Team with the collaboration of star-formation experts C. Robert O'Dell, Thomas P. Ray, and David Corcoran.

Photo and info: NASA and The Hubble Heritage Team (STScI)

Calendar of Events *continued*

January 16, 7:30 p.m.
What: *How Stars Are Made*
Who: Dr. Steven Stahler (U.C. Berkeley)
Where: Chabot Space & Science Center.
Cost: $5

Star light, star bright—on a clear night, the sky is filled with countless stars. Images taken with radio and infrared telescopes tell us that new stars are being formed all the time throughout our Galaxy. How does a star evolve? Hear Dr. Stahler, an astrophysicist at UC Berkeley whose specialty is star formation, explain how small interstellar gas clouds undergo gravitational collapse to form primitive stars, which then evolve to become mature objects like our Sun.

Meet the speaker at a dessert reception following the lecture.

January 29, 7:00 p.m.
What: *Failed Stars or Supergiant Planets: A Cosmic Identity Crisis*
Who: Dr. Gibor Basri (U.C. Berkeley)
Where: Smithwick Theater, Foothill College.
Cost: Free

The Silicon Valley Astronomy Lecture Series has sponsored a non-technical illustrated talk on *Failed Stars or Supergiant Planets: A Cosmic Identity Crisis* by Dr. Gibor Basri. The talk is free and open to the public and will be held in the Smithwick Theater at Foothill College, El Monte Road and Freeway 280, in Los Altos Hills.

Dr. Basri, who has made pioneering observations of the mysterious objects called "brown dwarfs," will discuss the shadowy realms that lie between being a planet and being a star – a realm which we have only been able to get information about in the last few years. In the process, he will explain how astronomers are learning to make more sophisticated distinctions about exactly what it takes to be a star.

Call the series hotline at 650-949-7888 for more info.

The talk is co-sponsored by: NASA Ames Research Center, Foothill College Astronomy Program, SETI Institute, and the Astronomical Society of the Pacific

January 30, 8:00 p.m.
What: *Exploring Mars: Recent Discoveries and Upcoming Missions*
Who: Michael Carr
Where: U.S. Geological Survey in Menlo Park.
Cost: $15

Exploring Mars: Recent Discoveries and Upcoming Missions by Michael H. Carr, Planetary Geologist.

Thirty years of Mars exploration have revealed a spectacularly diverse planet.

Dry river valleys and layered sediments suggest a warm, wet past.

Huge floods may have created transient oceans.

Towering volcanoes, deep canyons, and global fracture systems dwarf their counterparts on Earth.

Two US rovers and a European lander, to be launched this May and reach Mars in January 2004, are expected to shed new light on how the planet evolved.

Please join them for what promises to be a very interesting and informative talk.

continued on page 7

Astro Events

Jupiter Transits

Below is 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.

January

Date	Object	Starts	Transits	Ends
Fri 10	GRS	7:40p	9:40p	11:40p
Sun 12	GRS	1:20a	3:20a	5:20a
	GRS	9:20p	11:10p	1:10a
Mon 13	GRS	na	7:05p	9:05p
Wed 15	GRS	7:00p	8:40p	10:45p
	Is	8:02p	9:10p	10:20p
	I	8:28p	9:35p	10:45p
	Gs	9:25p	11:15p	1:00a
	G	11:05p	1:00a	2:43a
Fri 17	GRS	8:20p	10:20p	12:20a
Mon 20	GRS	na	7:40p	9:40p
Wed 22	GRS	7:45p	9:25p	11:35p
	Is	9:58p	11:05p	12:13a
	I	10:12p	11:20p	12:27a
Fri 24	Is	na	na	6:42p
	I	na	na	6:54p
	Es	na	7:08p	8:31p
	E	na	735p	8:56p
	GRS	9:05p	11:05p	1:05a
Sat 25	GRS	na	6:50p	8:50p
Mon 27	GRS	6:45p	8:40p	10:40p
Wed 29	GRS	8:35p	10:15p	12:15a
Fri 31	Is	na	7:30p	8:36p
	I	na	7:38p	8:38p
	Es	8:16p	9:44p	11:07p
	E	8:19p	9:44p	11:10p
	GRS	9:55p	11:50p	1:50p

February

Sat 1	GRS	na	7:45p	9:45p
Mon 3	GRS	7:25p	9:25p	11:25p
Fri 7	I	8:06p	9:15p	10:22p
	Is	8:14p	9:20p	10:30p
	E	10:33p	12:00a	1:25a
	GRS	10:45p	12:15a	1:42a
	Es	10:52p	12:45a	2:30a
Sat 8	GRS	6:30p	8:30p	10:30p

Astronomical Insights

by David Feindel

Lesson for the month: when seeing and transparency are good, observe! Dec 27, our first evening at the Grand Canyon, offered spectacular views. Stars were steady, even at 10 degrees above the horizon. The Milky Way was visible, almost horizon-to-horizon. So what made me wimp out? Fifteen degrees (that's F, not C!) and wind. Rationalizing that I had 6 more days under dark skies, I contented myself with naked-eye astronomy until the cold set in. But the fates had something else in store—six straight days of "mostly cloudy" to "completely overcast". So much for dark-sky observing on the trip.

But if bad weather turns you into an armchair astronomer, Flagstaff is not a bad place to be. First off was a visit to the meteor crater outside Winslow, AZ, where a ~150' diameter meteor hit around 50,000 years ago. The crater—4000' diameter and 550' deep—is impressive. The museum on-site is actually fairly good, going light on the sensationalism of "sudden impacts" and focusing more on the science of meteors. There is a discussion on other impacts, both real (Yucatan, 65 million years ago) and hypothesized (impacts ~225 million and ~500 million years ago). There is also an exhibit on the Near Earth Object Search ("NEOS") program, which attempts to identify near-earth orbiting bodies and predict the relative risk they pose to earth. Eugene Shoemaker, the astronomer, has connections to the crater (his paper, "First Natural Occurrence of Coesite" is based on research at the crater), as does the noted architect Philip Johnson (his design for the museum won out over Frank Lloyd Wright's design).

The 24" Alvan Clark refractor at the Lowell Observatory.

Pride of place, though, is the Lowell Observatory. Created in 1894 by Percival Lowell to study Mars with his 24" Alvan Clark refractor, it has evolved into a private research foundation with multiple research-grade instruments (which are located off-site on Anderson Mesa, about 15 miles S of town). The observatory, considered state-of-the-art in its day, was created in what was considered wilderness; at the time, Flagstaff was only 12 years old, and it was a 6+ hour

train ride to the nearest big town. Its remoteness is brought home by the fact that Lowell used a Sears's mail-order frying pan and pot for dust caps to the two finder scopes! Slipher used this telescope to discover that the universe was expanding (1912-1917).

Lowell is most famous for Clyde Tombaugh's discovery of Pluto. One of the exhibits is the Zeiss blink comparator he used to compare photographic plates. It's in operation, giving visitors the chance to see if they can pick out Pluto. With the helpful arrow, you can see it in only a few blinks; without the arrow, it is very, very, very difficult, even knowing Pluto is on the two plates you are comparing. Tombaugh truly earned the discovery of Pluto. He took hundreds of photographic plates (each an hour-long manually guided exposure, often in sub-freezing weather), and then spent hours scanning the 14"x19" sets of plates looking for objects that moved during the time between exposures.

One sad fact, not mentioned anywhere I could find, is that Robert Burnham, author of *Burnham's Celestial Handbook*, isn't recognized, despite being a technician at Lowell for decades and writing the books while there.

NASA's Space Place

Frisbees in Space

by Dr. Tony Phillips

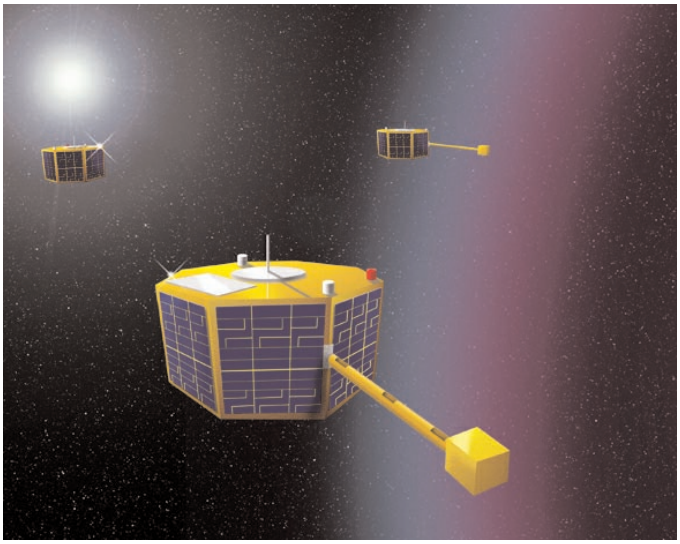
When Pete Rossoni was a kid he loved to throw Frisbees. Most kids do-it's pure fun. But in Pete's case it was serious business. He didn't know it, but he was practicing for his future career in space exploration.

Grown-up Pete Rossoni is now an engineer at NASA's Goddard Space Flight Center. His main project there is figuring out how to hurl spacecraft into orbit Frisbee-style.

The spacecraft are small-about the size of birthday cakes. "This wouldn't work with big satellites or heavy space ships like the shuttle," notes Rossoni. But a cake-sized "nanosatellite" is just right.

Nanosatellites–nanosats for short–are an exciting new idea in space exploration. Ordinary satellites tend to be heavy and expensive to launch. The cost alone is a deterrent to space research. Nanosats, on the other hand, can travel on a budget. For example, a Delta 4 rocket delivering a communications satellite to orbit could also carry a few nanosats piggyback-style with little extra effort or expense.

"Once the nanosats reach space, however, they have to separate from their ride," says Rossoni. And that's where Frisbee tossing comes in.



An artist's conception of nanosats (nanosatellites).

Rossoni has designed a device that can fling a nanosat off the back of its host rocket. "It's a lot like throwing a Frisbee," he explains. "The basic mechanics are the same. You need to impart the spin and release it cleanly-all in about a tenth of a second." (The spinning motion is important because it allows the science magnetometer to measure the surrounding field and lets sunlight to play across all of the nanosat's solar panels.)

The ST5 nanosats are designed to study Earth's magnetosphere—a magnetic bubble that surrounds our planet and protects us from the solar wind. But their primary goal, notes Rossoni, is to test the technology of miniature satellites.

"We haven't done anything like this before," says Rossoni. Soon, however, the concept will be tested. A trio of nanosats is slated for launch in 2004 on the back of a rocket yet to be determined. The name of the mission, which is managed by JPL's New Millennium Program, is Space Technology 5 (ST5).

Can groups of nanosats maintain formation as they fly through space? Will their internal systems-miniaturized versions of full-sized satellite components-satisfy the demands of both the harsh space environment and critical science measurements? Is Frisbee-tossing as much fun in orbit as it is on Earth? ST5 will provide the answers. Read about ST5 at at http://nmp.nasa.gov/st5. Budding young astronomers can learn more at http://spaceplace.nasa.gov/st5/st5_tortillas1.htm

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

What's Up *by Debbie Dyke*

All times Pacific Standard unless otherwise noted.

January

1	Wed	1801 First asteroid (Ceres) discovered by Giuseppe Piazzi.
2	Thur	**New Moon** 12:23 p.m.
3	Fri	Earth at perihelion (closest to the sun) at 0.983320 AU.
7	Tues	1610 Galileo discovers Jupiter's moons Io, Europa, and Callisto.
8	Wed	1942 Steven Hawking born.
10	Fri	**First Quarter Moon** 5:15 a.m. 1968 Surveyor 7 lands on the Moon near Tycho. Moon at apogee (250,692 mi/404,343 km) 5:00 p.m.
11	Sat	Mercury in inferior conjunction 12:00 p.m. Venus at greatest western elongation at 47°.
13	Mon	1610 Galileo discovers Ganymede.
15	Wed	The waxing gibbous Moon passes within 5.5° of Saturn in Taurus.
17	Fri	**Tri-Valley Stargazers general meeting**. 7:30 p.m. at the Unitarian Universalist Church, 1893 N. Vasco Road, Livermore.
18	Sat	**Full Moon** 2:48 a.m. The Moon is 7° from Jupiter. By early morning it gets as close as 3.5°.
19	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.
20	Mon	**Tri-Valley Stargazers Board meeting**. 7:00 p.m. at the Round Table Pizza in Livermore.
23	Thur	Moon at perigee (229,336 mi/369,898 km) 2:00 a.m.
24	Fri	1986 Voyager 2 flyby of Uranus.
25	Sat	**Last Quarter Moon** 12:33 a.m.
27	Mon	1967 Apollo 1 capsule catches fire while sitting on launch pad, killing all three astronauts on board. In the morning look East to see the waning crescent Moon just 1° from Mars.
28	Tues	1986 Space Shuttle Challenger explodes soon after liftoff.
31	Fri	Neptune in conjunction with the sun.

February

1	Sat	Kung Hei Fat Choy! Today starts the Year of the Goat in the Chinese Lunar calendar. **New Moon** 2:48 a.m.
2	Sun	Ground Hog Day. Jupiter at opposition (401 million miles from Earth) 1:00 a.m.
3	Mon	1966 First soft landing on Moon by the Soviet spacecraft Luna 9. Luna returns the first pictures of the surface of the Moon. Greatest western elongation of Mercury 25°.
4	Tues	1906 Clyde Tombaugh (discoverer of Pluto) born.
7	Fri	Moon at apogee (250,822/404,552 km) 2:00 p.m. 1984 First untethered spacewalk performed by Challenger astronauts Bruce McCandless and Robert Stewart.
8	Sat	1677 Jacques Cassini born.
9	Sun	**First Quarter Moon** 3:11 a.m.

Calendar of Events *continued*

January 31, 8:00 p.m.
What: *Dark Sky Blue Dream*
Who: Julia Ogrydziak & Elaine Chew
Where: Chabot Space & Science Center.
Cost: $15 general
$12 Chabot Members, kids, seniors & students
Free to kids 3 and under

Immerse yourself in Dark Sky Blue Dream, the world premiere of a multimedia and musical performance by two of the foremost contemporary musicians of today. Let your imagination swirl to the visuals of the planetarium and the sounds of violin and piano, as darkness becomes visible. This evening's performance promises to be unforgettable. Julia Ogrydziak (violin) and Elaine Chew (piano) have collaborated closely with the top composers of our age and have performed worldwide to critical acclaim. Audiences everywhere have warm praise for their intriguing program selections and their refreshing interpretations.

Program: Pärt, *Fratres*; Bolcom, *Sonata No. 2*; Saariaho, *Nocturne*; Takemitsu, *Hika*; Ravel, *Sonata*

Hunt For Planets with Dr. Geoff Marcy at W.M. Keck Observatory

The Astronomical Society of the Pacific (ASP) is auctioning off an observing night at the W.M. Keck Observatory in Hawai'i with internationally renowned astronomer Dr. Geoff Marcy. The ASP has pledged to donate 5% of the auction proceeds to the amateur astronomy club of the winner's choice.

The highlight of the five day/four night trip for two is the opportunity to spend a night in the Keck I control room with Dr. Marcy and his team during one of his scheduled observing runs. Dr. Marcy will host dinner that evening, and the winner will be able to sleep overnight at the VSQ (Visiting Scientists' Quarters), which is open only to astronomers. The auction package includes round trip airfare for two, resort accommodations, car rental, meals, and a behind-the-scenes VIP tour of the W.M. Keck Observatory conducted by a Keck staff member.

Potential bidders may visit the ASP Web site at www.astrosociety.org to get full information and to sign up to be notified exactly when the auction will begin. The auction will be held sometime in January 2003 on eBay. The winner can schedule the trip to coincide with any of Dr. Marcy's scheduled observing nights in 2003.

The Keck I and II twin 10-meter telescopes are the world's largest optical telescopes, located at the summit of Mauna Kea on the Big Island of Hawai'i, at an altitude of 13,796 feet. The Observatory headquarters, Visiting Scientists' Quarters, and control rooms are located in Waimea, at about 2,500 feet.

2002-2003 Questionnaire

If it's membership renewal time, it must also be Questionnaire time. We've streamlined the Questionnaire a bit, so hopefully we'll get a few more responses than we ordinarily do. If you need more space to write, feel free to continue your comments on another piece of paper.

1. What kind of instrument do you use the most for observing? _____

_____

2. What program topics would you like us to cover at the meetings? _____

_____

3. Are there any books, DVDs, etc., you would like to see added to the TVS library? _____

_____

4. Do you have any suggestions about ways that the club could be improved, about activities you would like us to provide, etc.? _____

_____

5. Are there any articles, features, etc., you would like to see in the newsletter? _____

_____

6. Would you be interested in participating in a weekend public star party at Camp Shelly (Lake Tahoe) in the summer of 2003? _____

7. Would you be interested in participating in an telescope making workshop in the spring of 2003? _____

_____

8. What improvements would you like to see at our dark sky site, H2O? _____

_____

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

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.
_____ $29.95 Subscription to *Sky & Telescope* magazine.
_____ $29 Subscription to *Astronomy* magazine.
_____ $20 Hidden Hill Observatory (H2O) refundable key deposit (key property of TVS).
$_____ Tax deductible contribution to Tri-Valley Stargazers.

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

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