

# Saguaro Astronomy Club



# SACnews

Volume 34 Issue 5

Summer 2010

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## Inside This Issue

<i>DCT Nears First Light</i>	1
<i>NASA's Space Place—Ancient Supernova Riddle Solved</i>	2
<i>Last Call For Observations—Camelopardalis</i>	4
<i>President's Message</i>	6
<i>Calendar of Events</i>	7
<i>Bits &amp; Pieces—Minutes of the April 30 General Meeting</i>	8
<i>From the Editor</i>	8
<i>Bits &amp; Pieces—Minutes of the May 28th General Meeting</i>	9
<i>Monthly Trivia Question</i>	9
<i>Top 20 Things: # 18: Jupiter's Moons</i>	10

## Our Discovery Channel Telescope is Nearing First Light By Marjory Vin Williams

Yes, ours.

The Discovery Channel Telescope will be the fifth largest telescope in the continental United States. This great machine is to be the flagship of Lowell Observatory.

At 17 miles away and due east of Village of Oak Creek, Discovery is in our yard making us the most important keepers of this space-age machine. From its volcanic precipice you can clearly see Jerome, the cuts of Interstate 17 in Copper Canyon as it heads for Phoenix, and the vast vista of the Verde Valley. If



Photo Courtesy of Jack Jones; [Telescoperc@cox.net](mailto:Telescoperc@cox.net)

you are driving around the Valley, look for a shiny silver object in the pine skyline of the Rim. Much of its viewing ability depends on a dark sky, and so it is we who must help lessen light pollution to make a comfortable and welcoming home for Discovery.

This major telescope will have a mirror to help focus the light that is 167 inches (4.2 meters) in diameter, a size between the Wilson 100 and the Palomar 200. Try to compare the eye size of the telescope to your own eye size. What makes it so stellar is that additionally it has all the latest electronics, exchangeable newly invented

instruments, and the mirror can change shape as is needed with each object it observes.

Any day now, the mirror glass will be lugged up here from Tucson and be laid in the building, adjacent to the Observatory, for surfacing with aluminum; this makes it a mirror. The glass came from

Corning Glass (think of a Pyrex pie plate 14 feet wide) and has been in Tucson for polishing the surface.

Discovery will have four different optical configuration capabilities, a 36-million pixel CCD the size of 25 pennies

forming a 5 cent by 5 cent rectangle to photograph the images, the 6,700 pound mirror which can “unhook” and be moved to a nearby building on the grounds for resurfacing, and 120 sensors and “pushers” on the back of the mirror that will actually change its shape. These advanced science devices nearly puts Discovery on par with a telescope in space.

Discovery will survey for asteroids and search for extra-solar system planets, delve into star nursery activity, the aging processes of stars like the sun, and what governs the rates of spin of stars.

*(Continued on page 3)*



## Ancient Supernova Riddle, Solved

By Dr. Tony Phillips

*Australopithecus* squinted at the blue African sky. He had never seen a star in broad daylight before, but he could see one today. Was it dangerous? He stared for a long time, puzzled, but nothing happened, and after a while he strode across the savanna unconcerned. Millions of years later, we know better.

That star was a supernova, one of many that exploded in our corner of the Milky Way around the Pliocene era of pre-humans. *Australopithecus* left no records; we know the explosions happened because their debris is still around. The Solar System and everything else within about 300 light-years is surrounded by supernova exhaust—a haze of million-degree gas that permeates all of local space. Supernovas are dangerous things, and when one appears in the daytime sky, it *is* cause for alarm. How did Earth survive? Modern astronomers believe the blasts were too far away (albeit not by much) to zap our planet with lethal amounts of radiation. Also, the sun's magnetic field has done a good job holding the hot gas at bay. In other words, we lucked out.

The debris from those old explosions has the compelling power of a train wreck; astronomers have trouble tearing their eyes away. Over the years, they've thoroughly surveyed the wreckage and therein found a mystery—clouds of hydrogen and helium apparently too fragile to have survived the blasts. One of them, whimsically called "the Local Fluff," is on the doorstep of the Solar System.

"The observed temperature and density of the Fluff do not provide enough pressure to resist the crushing action of the hot supernova gas around it," says astronomer Merav Opher of George Mason University. "It makes us wonder, how can such a cloud exist?"

NASA's Voyager spacecraft may have found the answer.

NASA's two Voyager probes have been racing out of the solar system for more than 30 years. They are now beyond the orbit of Pluto and on the verge of entering interstellar space. "The Voyagers are not actually inside the Local Fluff," explains Opher. "But they are getting close and can sense what the cloud is like as they approach it."

And the answer is....

"Magnetism," says Opher. "Voyager data show that the Fluff is strongly magnetized with a field strength between 4 and 5 microgauss. This magnetic field can provide the pressure required to resist destruction."

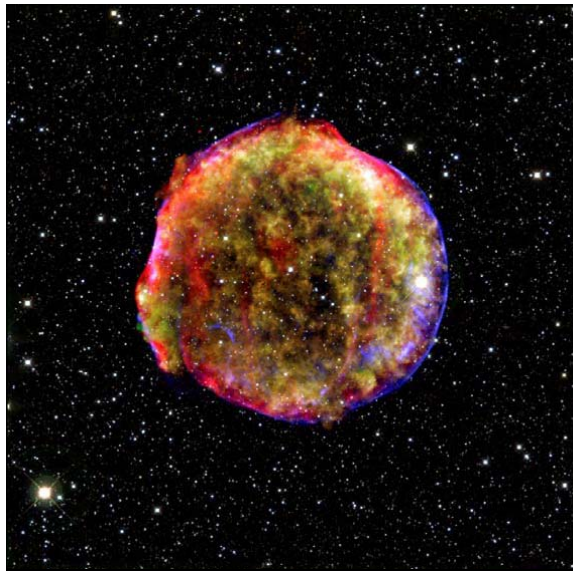
If fluffy clouds of hydrogen can survive a supernova blast, maybe it's not so surprising that we did, too. "Indeed, this is helping us understand how supernovas interact with their environment—and how destructive the blasts actually are," says Opher.

Maybe *Australopithecus* was on to something after all.

Opher's original research describing Voyager's discovery of the magnetic field in the Local Fluff may be found in *Nature*, **462**, 1036-1038 (24 December 2009). The Space Place

has a new Amazing Fact page about the Voyagers' Golden, with sample images and sounds of Earth. After all, just in case one of the Voyager's ever meets up with ET, we will want to introduce ourselves. Visit <http://spaceplace.nasa.gov/en/kids/voyager>.

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



*Left-over cloud from the Tycho supernova, witnessed by Tycho Brahe and other astronomers over 400 years ago. This image combines infrared light captured by the Spitzer Space Telescope with x-rays captured by the Chandra X-ray Observatory, plus visible light from the Calar Also Observatory in Spain.*

*(Continued from page 1)*

In 2005 a Discovery speaker was asked about fire defense preparations. He got that deer-in-the-headlights look. Now, four years later, there is a 62-foot wide observatory, shielded on one side by a volcanic cliff under it, but seemingly in danger on the northeast side. Certainly the 700-foot defensible area suggested by some fire experts in places like Montana is absent...shades of the Mount Stomlo Telescope in Australia that burned up a few years ago. We'll watch to see how they make our telescope defensible against fire in the next few months.

On a beautiful Saturday morning, take a drive on I-17 to Exit 293 and swing around the three-mile curve from McGuireville to Cricket's Dessert and Sandwich Shop in the village of Lake Montezuma.

Kay Nye will be baking homemade cinnamon rolls for breakfast as she has mornings for 25 years. Her daughter Stefanie or her husband Ralph may serve them to you. If it is Ralph, ask how the Discovery Channel Telescope is coming along.

Despite the crowd, Ralph may, more than likely, beam and pour out the latest engineering doings at the DCT. Your sometimes cook and waiter on weekends is really "Ralph Nye the Lowell ME (mechanical engineering) Guy," aka Lowell Observatory's Director of Technical Services! He is one of Lowell's fine mechanical engi-

neering people that began with Stanley Sikes, the Flagstaff bicycle repairman of a century ago.

You might even go further and visit Discovery, two miles from the Happy Valley Ranger Station on the Lake Mary Road. This is a beautiful and interesting trip. If you are visiting the Verde Valley, you might then drive to the art and consignment shops in Sedona, or return to Cricket's (open Tuesday through Saturday from 7:30 to 2:00) for a great lunch.

The Verde Valley towns and counties are doing a good job, so far, at following the light pollution ordinances in curbing "up-lighting" and advocating for reduction of uncovered lights in order to protect the dark skies for the many Naval and Lowell telescopes, and for the rest of us who are lucky enough to see the Milky Way here. Now we have Discovery, we need to try even harder not to shine light upwards or have an unnecessary amount of it. We must ask, in our lighting decisions, what is best for our wonderful dark sky to remain.

First light and opening should be in 2010. Let's be up there with Discovery and celebrate her birth.

Marjory Williams and Jack Jones are both members of the Saguaro Astronomy Club. Marjory lives on Oak Creek while Jack is considering moving to the Verde Valley in the future.



*Twiggy: The DCT Mirror Peeks Out at Its Home on June 8th*

*With errors corrected, the mirror will have only minor errors of 16 millionths of a mm. She is thin, thin, thin: 1/40th of the diameter, but fairly wide: 4.28 meters/ 168.5 inches of clear aperture.*

## Call For Observations—Camelopardalis

By A.J. Crayon

This is our second pass through Camelopardalis – the camel. This month's tour takes us through an assortment of deep sky objects.

The tour starts with **Tombaugh 5**, which was discovered by Clyde Tombaugh. We all know he discovered Pluto but there are many star clusters with Tombaugh's name. This one is found at R.A. 03h 47.7' Dec +59° 05' and is almost 20' in size with many stars. How many did you count or estimate? In answer to this question Charlie Whiting counts 25 in his 8" and Dan Gruber counts 40 in his 18".

**8" F6 Newtonian, 38X**; Charlie Whiting: this open cluster can be seen with little difficulty. At **60X** the cluster is large, about 18' in diameter. It contains about twenty-five stars of 11<sup>th</sup> and 12<sup>th</sup> magnitude. There is also an underlying haze of stars too faint to resolve. Additionally there are two streamers of stars of similar magnitude running to the north and the south on the west side of the cluster.

**8" SCT at 206x**; Richard Harshaw: Eight stars were resolved, the brightest 3 forming a nice little right triangle.

**18" f4.5, Dob, 135X**; Dan Gruber: This open cluster is about 20' wide. I counted about 25 mag 10 -11 stars and about 15 more fainter stars, somewhat concentrated in a rectangle with major axis NW - SE.

Next is the planetary nebula **NGC1501** located about 3° northeast of Tombaugh 5. Does this 12<sup>th</sup> magnitude planetary nebula look round or elongated to your eye? Charlie Whiting and Rick Rotramel see it as round.

**8" F6 Newtonian, 38X**; Charlie Whiting: this planetary can be seen as a tiny but extended object about midway between two stars, 7<sup>th</sup> and 9<sup>th</sup> mag. At **150X** the PN is round, about 2' in diameter. It seems to be textured. It is evenly bright over its extent. 14<sup>th</sup> mag stars flank the PN to the northeast and southwest. A 13<sup>th</sup> mag star lies to the northwest.

**8" SCT, 104x**; Richard Harshaw: Grainy, with indistinct edges and a ring, with a slight bluish tint.

**11" SCT, 115x**; Richard Harshaw: Large and dim, perhaps slightly brighter at the center. With the O-III filter, there is a hint of an annulus.

**16" f4.4 Newtonian, 200x**; Rick Rotramel: PN - fL, fB, round, very faint central star.

**18" f4.5, Dob, 460X**; Dan Gruber: This planetary nebula has a large (>1') mottled outer halo. The central star is clearly visible within a slightly darker inner ring about 1/3 the diameter of the halo.

Then 1.5° to the north is the open cluster **NGC1502** that has 2 doubles - Struve 484 and Struve 485. This cluster has about 45 stars.

**8" F6 Newtonian, 150X**; Charlie Whiting: While this cluster can be seen at lower magnifications, it took this power well and it filled out the FOV a little better. This is an interesting cluster in that it has a double star near its center. The two brightest members are almost equally bright at 7<sup>th</sup> mag. Widely separated and both looked light yellow. The double is called HZG 2 and one of its members is also called SZ Cam. It is a variable, 7.0 to 7.3m. The Yale Bright Star Catalog says there are 12 components to this system. The WDS says there are 9 components. I counted about 25 stars other than the bright pair that I think is part of the NGC 1502 cluster. I estimated them to be 9<sup>th</sup> to 11<sup>th</sup> mag. I saw the cluster as being in the shape of a pine tree.

**8" SCT at 83x**; Richard Harshaw: An excellent view, with a 7<sup>th</sup> mag double 20" apart (STF 485). It looks best at low powers, with an E-W axis and bleak field. There are many blue stars, and a V-shape pattern- where the arms of the "V" join, there is a tiny ringlet of stars. STF 484 is also a member of this cluster (10 mag/10.5 mag, 5" in pa132), as well as es 122 (8.6 mag/10.9 mag, 6" in pa249). STF 485 is also a member (on the E side).

**11" SCT at 115x**; Richard Harshaw: Small, compact, dominated by a bright pair at the center (STF 485). 24 stars counted, and many pairs.

**16" f4.4 Newtonian**, Rick Rotramel: OC - fL, B, triangle shaped, ~50 stars, a bright pair in the middle.

**18" f4.5, Dob, 154X**; Dan Gruber: A 10' wide open cluster with about 40 stars from mag 8 down to about mag 13. There's an evenly-matched white possible double of mag 8 stars (45 - 60" separation, PA 90) in the center and another attractive yellow - blue possible pair in the NE.

Now a departure for our normal selection brings us to an asterism called **Kemble's Cascade**. It is a chain of 19 stars about 4° degrees starting from NGC1502. A good binocular or finder object.

**60mm spotter at 10x**; Richard Harshaw: Walter Scott Houston describes it as "a celestial waterfall of dozens of 9<sup>th</sup> and 10<sup>th</sup> mag. stars." I agree! It was named by Walter Scott Houston (1980, 1985) for Father Lucian Kemble who first wrote about it.

**7X50 binoculars**; Charlie Whiting: This grouping of stars runs roughly southeast to northwest. The line is nearly but not quite straight. It is shaped like the figure of the calculus integral sign. There is a 5<sup>th</sup> mag star near the middle. There are three 5<sup>th</sup> and 6<sup>th</sup> mag stars in the bottom (western) half. At the top (eastern end) there's a faint grouping forming a triangle. The triangle is actually the NGC 1502 open cluster. There are about a half dozen 6<sup>th</sup> and 7<sup>th</sup> mag stars that form the upper half. Below the lower half there are some very faint stars that tail off for a

*(Continued on page 5)*

(Continued from page 4)

fairly long distance.

Our start with galaxies is **UGC 3580**, almost 12<sup>th</sup> magnitude, elongated and it should have a small brighter middle.

**8" F6 Newtonian, 60X**; Charlie Whiting: This galaxy was not visible at low magnification. At this power it could only be seen using averted vision. Even at **150X** it still needed averted vision to see it. The galaxy is elongated, about 2' by 1', aligned north-south. It had no central condensation that I could detect. It was very gradually brighter towards the middle. There are two 13<sup>th</sup> mag stars to the southwest of the galaxy, pointing to the west.

**18" f4.5, Dob, 329X**; Dan Gruber: This is a 5' X 3' elongated galaxy oriented NW - SE. There is no obvious core or nucleus.

Our last object, another galaxy, is **NGC2715**, a barred galaxy, that is 11<sup>th</sup> magnitude, elongated with a well defined outline.

**8" F6 Newtonian, 150X**; Charlie Whiting: This galaxy was not visible at magnifications below **150X**. It is just barely detectable with direct vision. Using averted vision it is seen as very elongated, about 3' by 1'. It looks like a flattened football. It is evenly bright except it was a little fainter at the edges. There was no central condensation. It is aligned a little east of due north. It lies in a fairly sparse field for stars, making it a little tricky to find.

**8" SCT at 104x**; Richard Harshaw: Small, bright nucleus and fuzzy oval about 1 min S of a 10<sup>th</sup> mag star. This galaxy was host to SN 1987 mag.

**18" f4.5, Dob, 209X**; Dan Gruber: Another elongated galaxy 4' X 2' NE - SW with almost uniform brightness-no core or nucleus was seen.

### Call for Observations

**Ursa Major** again!? Why? There's so much to do and so little time. Galaxies are here, let's enjoy them to the utmost by including some Herschel 400 and SAC Best of the NGC. So we begin with **NGC3675** located about ½ degree northeast of 56 Ursa Majoris, in the southerly part of the constellation. It is elongated, bright and large. See what other detail is there for your viewing enjoyment. Moving to the bowl find **NGC3690**, a double system in collision with a near-by friend. It is bright, small, elongated and has a brighter middle. Moving just below the bowl is a recent personal favorite - **NGC3718**, an elongated barred spiral with central dust lane. It is difficult to see the bar but, in my 14" Dob, its brighter middle was bifurcated owing to the dust lane. In the field to east of northeast is companion NGC3729. What makes this a favorite is the fuzzy spot about 7' to the south. It is the compact galaxy group Hickson 56 that I observed in February this year. How many galaxies in this group can you see? Going in a southerly direction

from the bowl find **NGC3726** a bright, large spiral that is reported to have a well defined spiral pattern. How much of this pattern can you detect? It has some faint field stars. Staying in and around the bowl bottom is next NGC3729 a peculiar barred spiral. It isn't so bright or large but is in same field with NGC3718. What is so peculiar about this one? Finally find NGC3813, down in the southerly part again. This spiral isn't so large or bright. Any other distinguishing features you care to discuss?

It is rather surprising to me that Virgo has only been done once in this series of observing sessions. This means, naturally, time for a second pass. Because of the rather late time of year for this constellation, our selections will remain in the easterly region. We begin in the east or northeast part of the constellation with **NGC5566** a barred galaxy with ring. The dimensions indicate an elongated galaxy, but the NGC description doesn't follow up on this. What do you see here? Note there are two other galaxies in the field, but they are fainter than 12<sup>th</sup> mag. Going a little further east and about one-degree south is the elliptical galaxy **NGC5576**. Its E2 class would indicate very little elongation. In addition to this note there are two other galaxies in the field, but like out last object, there are fainter than 12<sup>th</sup> mag. Our next object will be somewhat of a surprise. Our slew takes us on a more southerly route to **NGC5634** a globular cluster! What sort of resolution do you see? Moving more to the northeast is barred galaxy **NGC5746**. It is located just 20' west of northwest from 109 Virginis. Although it is elongated can you detect central condensation or brightening. Also in the field of view is NGC5740, another galaxy listed as mag 11.9. Inching more eastward, near the Serpens Caput border, is **NGC5846**. This is another elliptical galaxy that should appear round to you eye. Is it? Beware here, our last object **NGC5850** is in the same field of view and it is up to you to identify which is which. Making this a more challenging project is the fact that there are other galaxies in the same field and near-by. You will not find a count of the galaxies here, it is up to you to determine the count and what you see in your telescope. Report your observations giving angle and distance of all from either of the two last ones on this list. Another note about which the reader and observer should be aware. All but the last are on the Herschel 400 list. Even if you have already observed these, go out and do so again and don't compare notes until after you have re-observed. What do you find of interest?

After completing these observations, take a few minutes and look towards the east. What do you see?

## President's Corner

### An Astronomical Menagerie!

By Dick Harshaw



#### An Astronomical Menagerie!

The other day I was browsing through an old astronomical text I own and came across a listing of common names for some otherwise famous (or not so famous) objects.

There are several named for animals:

- The Flying Minnow
- The Mice
- The Bug
- The Little Crab
- Jaws
- The Dark Emu
- The Red-necked Emu
- The Bull of Poniatowski
- The Fish on a Platter
- The Pelican
- The Running Chicken
- The Snake
- The Tarantula
- The Wild Duck

In addition to these, there are some named for foods:

- The Egg
- Gomez's Hamburger
- The Carafe (at least it holds coffee)
- The Teapot
- The Water Jar
- The Toby Jug
- The Toadstool (be careful which ones you eat!)

There are several more I found:

- Popper's Star
- The Cone
- The Teaspoon
- The Sunflower
- Baxendal's Nebula
- The Fath
- Bode's Nebula
- The Siamese Twins
- Hubble's Nebula
- Stephan's Quintet
- Stephan's Quartet
- The Box

There are probably several more I am missing. Here's the challenge: can you think of any others I have not listed? Also, can you give the more common names for all the ones in this month's column (NGC, IC, etc.)?

To "play", send your extra names and/or decoded list to my personal email, rharshaw2@cox.net. The one who gets the most additions AND correct aliases for the list in this column will get my old (1989) copy of Joseph Silk's book, "The Big Bang: Revised and Updated Edition". (Remember, this was 1989... it has probably been revised and updated several times SINCE then!) The winner will be announced in next month's President's Column and the book awarded at the next general meeting after that newsletter comes out (which means July).

Meanwhile, keep looking up and out.

# July 2010

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3 SAC Star Party at Cherry II
4 ☾	5	6	7	8	9	10 DOTM Star Party @ Cherry II
11 ●	12	13	14	15	16	17
18 ☽	19	20 ATM Meeting 1930, Paul Lind's House	21	22	23 SAC Meeting, GCU 1930	24
25 ○	26	27	28	29	30	31

## Schedule of Events for July 2010

July 3rd	SAC Star Party at Cherry II, Sunset 1945, Ast. Twilight Ends 2130, Moonrise 2340, 2:10 Hours of Dark Time
July 4th	Moon at last Quarter at 0734mst
July 10th	DOTM Star Party at Cherry II, Sunset 1943, Ast. Twilight Ends 2127, Ast. Twilight Begins 0341, 6:14 Hours of Dark Time
July 11th	Moon is New at 1240mst.
July 18th	Moon at First Quarter at 0310mst.
July 20th	ATM/Astro Imaging Subgroup Meeting at Paul Lind's House at 1930
July 23rd	SAC General meeting at Grand Canyon University at 1930: Member Show & Tell Night
July 25th	Moon is full at 1836mst

## Future Planning

Nov. 5th—6th	All Arizona Star Party at Farnsworth ranch in Arizona City. Goto: <a href="http://www.eastvalleyastronomy.org">www.eastvalleyastronomy.org</a> for more details.
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## Bits & Pisces, Minutes of the April 30th General Meeting Recorded by Paul Dickson



[I arrived at 1935]

SAC General Meeting Minutes: 2010/04/30

SAC voted on changes to the club's constitution regarding board vacancies.

Rick Tejera reminded everyone of the surplus t-shirts from the Messier marathon. Jack Jones had also brought previous shirts to be sold.

Rick suggest that, to remember David Fredericksen, we rename 5-mile Meadow as Fredericksen's Meadow for our uses. This motion was voted on and approved by the membership.

Rick gave out observing awards for club member's accomplishments. He started with the award for the SAC 110 Best of the NGC, which was awarded to Steve and Rosie Dodder. He then gave out the awards for the Messier marathon to our SAC members. The marathon had a total of 48 participants, with 16 getting first place of 109 objects.

Dick Harshaw continued the meeting and announced the constitution change had passed and Mitch Prause was nominated to the position of treasurer. Nominations were then closed and Mitch being the only one still being nominated, was voted into the position.

Steve Coe then introduced Tom Clark who talked about making an observatory in your backyard. He built a domed observatory for his 42" telescope.

Steve Dodder reminded us of the 50/50 raffle and the Novice Group services. He invited new members to visit him down in Maricopa and several people had already taken him up on the offer. As for the north rim of the Grand Canyon Star Party, he let us know that there was only 2 free night left for the room at the Kaibab Lodge (Saturday and Wednesday).

There was a break at 2032 until 2048. Tom Polakis then introduced Randy Peterson who spoke on Asteroid Occultations. He covered what it is, how to do them, and equipment needed. He is available for more information at [rgpeterson@xxxxxxxx](mailto:rgpeterson@xxxxxxxx)

There was a lively question and answer period at the end of the period with a lot of info regarding equipment. Some internet sites provided by Randy were:

<http://asteroidoccultation.com>  
<http://poyntsource.com/New/>

The OccultWatcher program:  
<http://hristopavlov.net/OccultWatcher/publish.htm>

The meeting adjourned at 2141. There were 44 people attending.

### From the Editor

We now continue with our regularly scheduled newsletter.

I'm actually quite surprised that I haven't been receiving a whole lot of "Hey where's the Newsletter" emails. I got a few, but give the last issue came out in April, I thought I'd have more folks asking.

Well the short story is: Life! the past two months have been quite busy for my whole family and some things fell by the wayside, SACnews was one of them. I pretty much spent May building a hotel, A hotel elevator and a jail (ask me when you see me, it'll be easier to explain).

Then just when I'm getting some spare time, my main computer dies. Fortunately, I have the NL files & all my observing notes on my laptop as well as the desk top AND on a flash drive. Somewhat fortuitously, I backed everything up about a week before the crash. Whew. Soooo, this leaves me with getting my email through webmail (for

some reason my laptop decided it no longer wants to download my email, still haven't figured out why) or on my iPod (if you get an email from me with even more spelling mistake than usual, good chance that's what I sent it from).

Along with that goes the sharing with Sue the one computer working in the house and there went any chance of getting an issue out last month.

On the bright side, I've amassed some material that should help get the next issue out on time. You can help in this regard by submitting articles for the NL. Remember, I'm still looking for submission for "Beginnings" the feature where you tell us how you got started in astronomy. Let me know if you need any guidance on how to submit an article or any ideas you may have that could ne NL-worthy.

Thanks for understanding. Rick



## Bits & Pisces, Minutes of the May 28th General Meeting Recorded by Paul Dickson



The meeting was started at 1931 by Dick Harshaw. The club had two visitors attending.

Steve Dodder was first with announcements. As leader of the novice group, he told us there would be no session next week as it would be the first day of the Grand Canyon Star Party. The GCSP was ready to start and looking good. He also remind us of the 50/50 raffle.

Mitch Prause did the treasurer's report. He mentioned that due to the previous confusion with the office of treasurer there may be some delays with magazine renewals that were turned in, with some renewals possibly not being recorded. In the future, you should perform your own magazine renewals directly with the magazine for the same discount. Sky & Telescope would just need the club name while you would have to get a number from Mitch for the discount from Astronomy.

Tom Polakis reported the conclusion of the Burnham Memorial Fund. The remaining funds have been

awarded as a scholarship.

Dick Harshaw gave a slideshow presentation with music that was made in memorial to David Fredericksen.

It was 1950 when Tom Polakis took over the meeting to introduce the speaker. He let everyone know that the July meeting would be show-and-tell. The subject matter does not need to be a PowerPoint presentation.

Our speaker was Chris Luginbuhl, who is from the US Naval Observatory in Flagstaff. His topic was titled "Uplight and Light Pollution: Where does it hurt?". The topic was about lights that were not full cutoff and their effect on the skyglow. This direct lighting at slightly above the horizontal angle is worse at greater distances than the reflected light bouncing off the ground. The discussion after the talk lasted nearly as long as the talk itself and covered many topics related to light pollution.

The meeting adjourned at 2100. There were 27 people attending. After the meeting, at J.B.'s, we had 19 people show up.

## Monthly Trivia Question

This Month's Question: One of the Iconic Images of Apollo was the call by Shorty Powers (The Public Affairs Officer) about 215 seconds before Liftoff of "Guidance is Internal!" What did this refer to?

Last Month's Answer: Little Known Fact: The American crew of The Apollo-Soyuz Test Mission almost died during re-entry. Why?

After re-entry, the Apollo spacecraft would vent all remaining propellants in the command module. After the propellants were vented the crew would then open a valve to the atmosphere to allow the cabin pressure to equalize with the ambient air

and to get the cabin atmosphere back to a mixed gas. Given the toxic nature of the propellants (Nitrogen tetroxide) You wanted to make sure all the propellant was gone before venting the cabin. The crew failed to do this and the toxic fumes were drawn into the cabin. Command Module pilot Vance brand lost conciousness and Docking Module pilot Deke Slayton became violently nauseous. The crew as hospitalized for two weeks after the mission as a result. This was the only serious mishap on an otherwise successful mission.



*The Apollo Soyuz Test Project Crews: From left to right: Deke Slayton, Tom Stafford, Vance Brand, Alexei Leonov, Valeri Kubasov*

The Flight was the 4th and final flight for Commander Tom Stafford and the 1st for Deke Slayton and Vance Brand.

# Top Twenty Things every Astronomer Should See

## #18: Jupiter's Moons, Including Moon Shadows

By Dr. Helen Mahoney

With Galileo's Telescope, he was able to observe things, in addition to the rings of Saturn that we mentioned last time. It was known in his time that Jupiter was not an ordinary star,. Instead of moving with the background "Fixed" stars, Jupiter and a few other celestial objects, including the Sun, the Moon, Mercury, Venus, Mars and Saturn., had separate motions along a path we call the ecliptic. They were named planets, a word meaning "wanderers" Except for the Sun & the Moon, the planets did not move consistently eastward. In the age of the Earth Centered universe, their back and forth retrograde movements prompted theories involving motion along spheres within spheres.

When Galileo viewed Jupiter, he saw four small stars in a line near the planet. The next time he viewed it, the little stars were in different positions. He plotted the positions over several days, and the movements strongly suggested that they were objects orbiting Jupiter. The fact that Jupiter could have bodies orbiting it gave strong evidence that the Earth-Centered theory of the Universe was flawed, and the Sun-centered Solar System proposed by Copernicus was correct.

It is easy to duplicate Galileo's observations of what we call the "Galilean Moons" of Jupiter. They are bright enough to see from even a light polluted sky, and with inexpensive equipment. Even a set of 10 x 50 binoculars will show you the moons, and a small telescope or 20 x 80 binoculars will give you enough resolution to plot positions the way Galileo did.

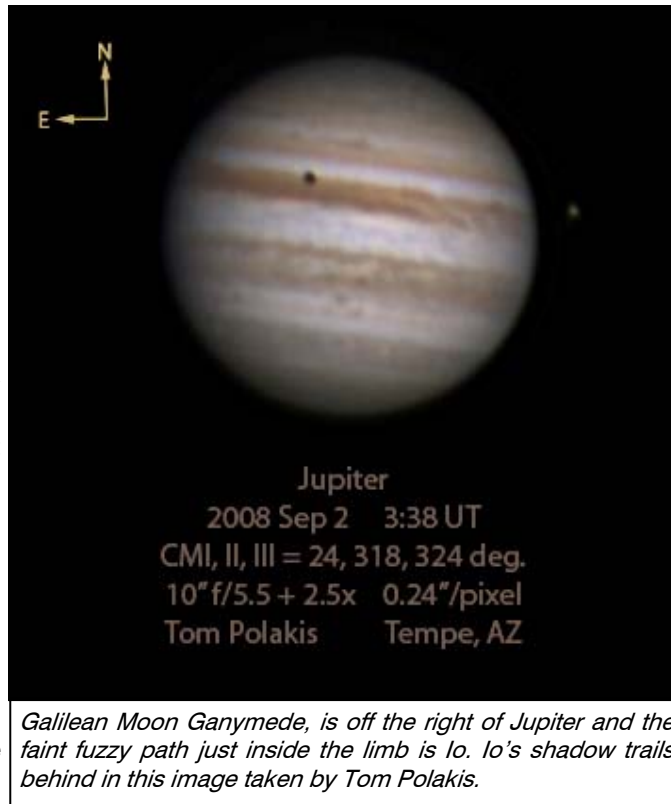
In Sky and Telescope and Astronomy magazines, there are diagrams to help you identify the moons and show you what you can expect to see. Those and other publications and web sites will also inform you of times when you will be able to see moon shadow transits. Frequently, the orbits of the moons will cause them and/or their shadows to move across the planet. It is difficult to see the actual moon when it passes over the bright surface of Jupiter. It is difficult to see the actual moon when it passes over the bright surface of Jupiter, but I was able to follow one once through a 16

inch telescope. The shadow is much easier to see, and quite fascinating.

Observing the motions of Jupiter's moons was important in 1780. The observations were a vital tool used by surveyors to accurately map our new country. Before the age of GPS systems, and before he was our first President, George Washington was a surveyor. To find your location on earth you need to know the angle of the Sun or a known star, and exactly what time it is. In 1780, they did not have accurate transportable clocks. (The marine chronometer was invented in 1765, but they were extremely expensive, so few could afford them.). Washington instead used Jupiter's moons to determine accurate time. He watched Jupiter's moons disappear, either in front or behind the planet, and compared these observations to a published ephemeris which predicted when these events would occur by Greenwich, England time. He then set his watch to that time. If he then observed the sun with a sextant at local noon, the time on his watch would show the difference in time between Greenwich and his location. This difference could be transferred into degrees East or West of Greenwich, since the Earth moves at about 15 degrees per hour. Thus he would know his location in longitude.

The remarkable thing is how easy it is for us to recreate one of the greatest pieces of scientific work. You can grab a small telescope, A Sketch pad and pencil, and make your own observations of the Galilean Moons of Jupiter. You can thus duplicate drawing that revolutionized astronomy-and caused mankind to changed the way he looked at his place in the Universe.

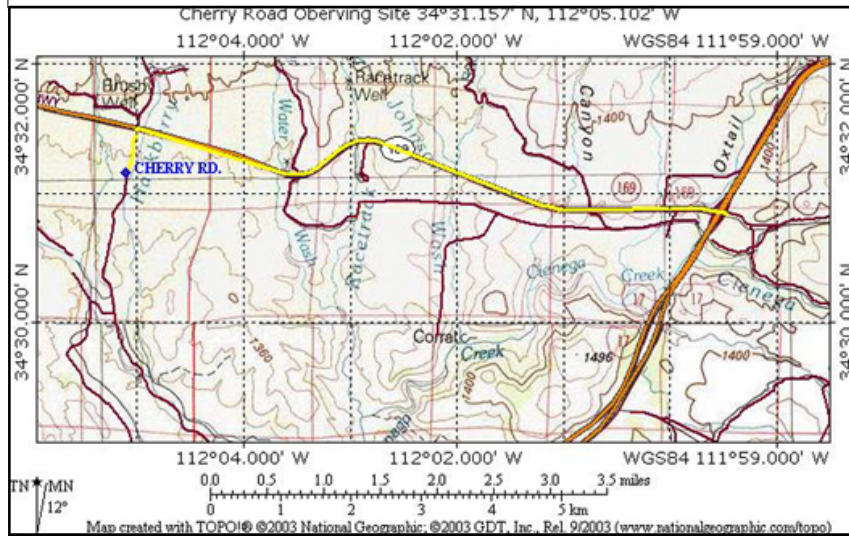
This article first appeared in the April 2010 issue of "Sirius Astronomer", the Information publication of the Orange County Astronomers and appears with their permission and the permission of the author. Visit them at: [www.ocastronomers.org](http://www.ocastronomers.org)



*Galilean Moon Ganymede, is off the right of Jupiter and the faint fuzzy path just inside the limb is Io. Io's shadow trails behind in this image taken by Tom Polakis.*

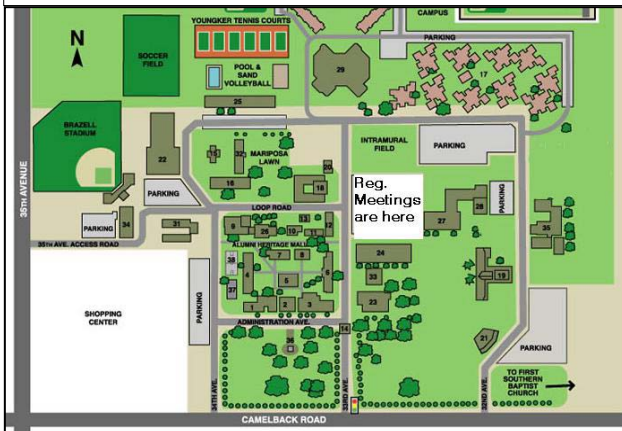
# SAC Member Services

## Cherry Rd. Star Parties



Take I-17 north to the Cherry Rd exit. Turn west (left) and continue on Cherry Rd for about 5 miles. Turn Left on the dirt road just past the sign that says Cherry 6. Note you turn in the direction Opposite the arrow on the sign. The site is 3/4 down the road on the left.

## General Meetings



7:30 p.m. at Grand Canyon University, Fleming Building, Room 105: 1 mile west of I-17 on Camelback Rd., North on 33rd Ave., Second building on the right.

## Dark of the Moon Star Parties-2010

<i>Date</i>	<i>Sunset</i>	<i>Moonset</i>	<i>Eve. Twi.</i>	<i>Morn. Twi./Sun Rise</i>	<i>Location</i>
<i>February 13th</i>	<i>1817</i>	<i>-</i>	<i>1941</i>	<i>TW: 0556</i>	<i>Antennas</i>
<i>March 13h (Messier Marathon)</i>	<i>1833</i>	<i>-</i>	<i>1955</i>	<i>MR: 0548</i>	<i>Arizona City</i>
<i>April 10th</i>	<i>1902</i>	<i>-</i>	<i>2028</i>	<i>MR: 0424</i>	<i>Antennas</i>
<i>May 15th</i>	<i>1924</i>	<i>2134</i>	<i>2102</i>	<i>TW: 0347</i>	<i>Cherry II</i>
<i>July 10th</i>	<i>1943</i>	<i>-</i>	<i>2127</i>	<i>TW: 0341</i>	<i>Cherry II</i>
<i>August 14th</i>	<i>1829</i>	<i>2200</i>	<i>2049</i>	<i>TW: 0417</i>	<i>Cherry II</i>
<i>September 11th</i>	<i>1841</i>	<i>2036</i>	<i>2006</i>	<i>TW: 0444</i>	<i>Cherry II</i>
<i>October 9th</i>	<i>1808</i>	<i>1920</i>	<i>1930</i>	<i>TW: 0513</i>	<i>Antennas</i>
<i>November 6th</i>	<i>1738</i>	<i>1756</i>	<i>1902</i>	<i>TW: 0534</i>	<i>Antennas</i>
<i>December 4th</i>	<i>1726</i>	<i>-</i>	<i>1854</i>	<i>TW: 0556</i>	<i>Antennas</i>

# SAGUARO ASTRONOMY CLUB

Summer 2010

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Email: newsletter@saguaroaastro.org



*Videmus Stellae*



## SAC Schedule of Events 2010

### SAC Meetings

January 29, 2010	<b>July 23rd, 2010</b>
February 26, 2010	August 20th, 2010
March 26th, 2010	September 24th, 2010
April 30th, 2010	October 22nd, 2010
May 28th, 2010	November 19th, 2010
June 25th, 2010	2010 Holiday Party, TBA

### SAC Star Parties

Date	Sunset	Astronomical Twilight Ends	Moonrise	Site
Jan. 9th, 2010	1742	1910	0351	S
Feb. 6th, 2010	1809	1933	0244	S
Mar. 6th, 2010	1833	1955	0131	S
Apr. 3rd, 2010	1854	2019	0014	S
May 8th, 2010	1919	2054	0245	C
Jun. 5th, 2010	1939	2123	0140	C
<b>Jul. 3rd, 2010</b>	<b>1945</b>	<b>2130</b>	<b>2340</b>	<b>C</b>
Aug 7th, 2010	1924	2059	0357	C
Sep. 4th, 2010	1850	2017	0246	C
Oct. 2nd, 2010	1811	1934	0138	C
Oct. 30th, 2010	1742	1906	0040	S
Nov. 27th, 2010	1725	1852	2339	S

### Future Planning

April 17th, 2010	Thunderbird Starwatch
June 5th-12th, 2010	Grand Canyon Star Party
June 11th-12th, 2010	5 Mile Meadow Star Party

S= Saddle Mountain; C= Cherry Road; A=Antennas