

BULLETIN

volume 83, issue 4 *April 2009*

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**OUR 82nd YEAR OF
ASTRONOMY IN LOS
ANGELES**

Los Angeles Astronomical Society
Griffith Observatory
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Los Angeles, CA 90027

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Editor's Corner
Public Support

Ask our members to please consider supporting our public events; the Griffith public star parties, the public outreach programs, or the new member star party in April. We need people without equipment to answer questions, to give the telescope operators a chance to go to the restroom or take a snack, and to help with crowd control. So please consider dropping by and helping a bit, and get a chance to socialize with both our members and the public.

We're continuing with the process of cleaning up the Garvey Ranch facilities. The board is still developing the procedures and hopefully an inventory of what we have. Please see page 5 for more details.

We're exploring ordering jackets with our LAAS logo on them. The details are not set yet, but we need to know who is interested in ordering them to set the price. Please see page 11 for details.

Luis Ashelford has alerted me to a film, "The Moving Earth", available at: http://www.danishdoc.dk/movingearth_uk.html. I don't have any other details.

My thanks to all who have contributed to the success of the bulletin. Please consider writing or submit images. Articles need to be 1,500 words or

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less. Submit only a few images at one time, each with its own caption. The deadline for submitting bulletin material is the 10th of each month. If possible, please submit electronically to:

BulletinEditor@laas.org

Material may be sent to the LAAS address listed at the top of the column at left, but timely reception and publication cannot be guaranteed. ✧

New Member Party !

The New Members Potluck And LAAS Open House will be held on April 18, 2009 at 5:00 PM in the Community Center at Garvey Ranch Park in Monterey Park. There will be a Star Party on the lawn after the meeting until 10:00 PM. There will be a raffle for the New Members and activities for all. Come for an evening of food, fun and star gazing.

If you'd like to volunteer or have any food or fun ideas for the event, please send an email to Andee at Coordinator@laas.org. ✧

Special Video

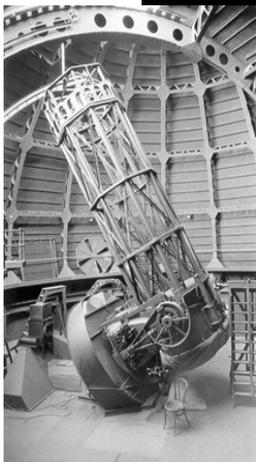
Luis Ashelford sent me this alert.

"400 Years of the Telescope, A journey of science, technology and thought" documentary. Panoramic visuals, cutting-edge technologies and introspective contemplations position "400 Years of the Telescope" as the must-see cinematic feature for the International Year of Astronomy in 2009.

Overview of the Documentary is available at:
<http://www.400years.org/documentary.php>

The trailer is available on YouTube at:
<http://www.youtube.com/watch?v=UFm6gubuP2o>

Mt Wilson 60" Nights



LAAS has arranged for two half-nights and one full-night at the Mount Wilson 60-inch telescope this year. All three are New Moon nights. Half-nights are until 1:00 am.

Aug 21st Fri (half night)
Sept 18th Fri (half night)
Oct 16th , Friday (full night)

Only LAAS members are allowed to sign up. If there is still room two (2) weeks prior to the date, paying guests will be permitted. Everyone who shows up, whether family member, friend, or guest, will have to pay in order to be allowed in the 60-inch telescope observatory. The cost is \$80 per person for the full night (no half night reservations on a full-night outing), and \$45 per person for the half night. We are allowed to accommodate only a limited number of participants at each session, and your reservations are being accepted on a first come, first serve, basis.

To secure your reservation, send in your request AND A CHECK payable to LAAS to our Treasurer at:

P.O. Box 56084
Sherman Oaks, CA 91413

Any LAAS member who has not been to a 60-inch night at Mount Wilson should consider it as an opportunity to visit astronomy history. To see the location and equipment used by giants such as Shapley and Hubble will add to your appreciation of their contributions.

The scope will belong to LAAS for the time indicated. We mutually agree upon which objects to view. Often, a member is the operator, so it is a very comfortable environment. (Do bring a coat, however). The viewing is without a doubt the best you are likely to see in your lifetime.

If you need any further information about attending these nights on Mount Wilson, contact our Treasurer at treasurer@laas.org or by mail at P.O. Box 56084, Sherman Oaks, CA 91413. ✧

Garvey Ranch Observatory Clean up and Policy update

We're continuing with the process of cleaning up the work shop at Garvey Ranch Park, including the development of procedures and policies concerning the storage of items, so your friendly neighborhood LAAS board asks for everyone's patience and understanding in the coming months.

We need help in this endeavor, both in organizing, moving stuff, writing catalogs, et al. Please contact the following people.

PJ Goldfinger : pj@chara-array.org

Mary Brown : nwwrgz@yahoo.com

David Sovereign : ddsovereign@yahoo.com

Astronomical Women

By Timothy Thompson

Today I write about women in astronomy. I will do this by presenting thumbnail biographies of a few famous, or perhaps not so famous, women whose names you may, or may not recognize. This isn't just to prove the obvious, that women can be astronomers too. Rather, to point out that the role of women in astronomy has been of major historical importance. Key, fundamental elements of astronomy and cosmology, owe their existence to women, even if that fact is not widely appreciated.

Hypatia of Alexandria (circa 370 – March 415)

Born sometime between 350 and 390, Hypatia of Alexander is generally considered to be the first woman "scientist"; science as we understand it today did not exist that long ago, but she fits the model well enough. She is certainly the first woman astronomer that we know of, and the first woman to make a substantial contribution to mathematics. Of course, astronomy in those days was the observational part of astrology, but this does not detract from Hypatia's influence. Daughter of the Greek mathematician and philosopher Theon of Alexandria, Hypatia was taught by him from an early age. She assisted her father in writing an 11-part commentary on Ptolemy's *Almagest*, and in Theon's edition of Euclid's *Elements*. She wrote *The Astronomical Canon*, probably an updated version of tables of planetary motions originally written by Ptolemy. Today we know only the titles of her works, as the originals have not survived the centuries.

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Caught in a bitter political rivalry between the Roman Imperial Prefect Orestes and the Christian Bishop of Alexandria, Cyril (later Saint Cyril), the pagan Hypatia was killed by fanatical Nitrian monks in 415. Many historians view the death of Hypatia as the death of ancient science and the beginning of a thousand years of dark ages in science and mathematics. Hypatia is the namesake for the lunar crater Hypatia (4.3 degrees south latitude and 22.6 degrees east longitude on the Moon) and the nearby rilles Rimae Hypatia, all visible in amateur telescopes.

Caroline Lucretia Herschel (1750-1848)

The sister of the well known astronomer Sir William Herschel (1738-1822), and aunt to William's son, astronomer Sir John Herschel (1792-1871), Caroline was an astronomer at a time when women were practically non-existent in any area of science. On August 1, 1786, Caroline discovered comet C/1786 P1 (Herschel), becoming the first woman known to have discovered a comet. She went on to discover 6 more comets, and to re-discover comet 2P/Encke, nearly 10 years after its initial discover, and nearly 10 years before Johann Encke got his name on the comet by figuring out its period. She also wrote the corrected version of Flamsteed's Catalog of Stars. Caroline received the Gold Medal of the Royal Astronomical Society in 1828. It would take 168 years before another woman received the Gold Medal, when it was awarded to Vera Rubin in 1996. In 1835 Caroline and science writer, mathematician and astronomer Mary Somerville (1780-1872) became the first women to be elected as honorary members of the Royal Society. Caroline died in Hanover, Germany, at the age of 98, and is buried there in the cemetery of Gartengemeinde on Marienstrasse. Asteroid 281 Lucretia, discovered by Johan Palisa in 1888 is named for Caroline Lucretia Herschel. In 1935 the lunar crater C. Herschel was named after Caroline; it is in the western area of Mare Imbrium at 34.5 degrees N. Latitude and 31.2 degrees west longitude on the Moon.

Henrietta Swan Leavitt (1868-1921)

Daughter of George Rosewell Leavitt and Henrietta Swan, Henrietta Leavitt was a descendent of John Leavitt, who made his way to Massachusetts from England in or before 1634. So she has deep roots in the "colonies". She started out as a "computer", which was the job title for most women in those days of astronomy, working for Edward Pickering at Harvard College Observatory, measuring and cataloging the brightness of stars on the observatory's collection of glass photographic plates. As you might guess, that's a lot of stars to catalog. In 1908 and 1912, Henrietta published two papers in the Annals of the Astronomical Observatory of Harvard College, which proved that Cepheid class variable stars with longer periods also had a higher intrinsic luminosity. This period-luminosity relationship for Cepheid variables became then, and still is now, the primary method for determining distances beyond the range of direct parallax measurements. Aside from spectroscopy, this period-luminosity relationship is

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one of the crucial tools of modern astronomy, and it was Henrietta who discovered it, doing “menial” work that the male astronomers did not waste their time on. That period-luminosity relationship was how Harlow Shapley measured the distance to globular clusters, providing the first definitive, observational proof, that Earth was not the center of the universe, in the 1920’s. And that period-luminosity relationship is how Edwin Hubble determined the distances of galaxies, from which he derived his redshift distance relationship, and we derived the basis for the expanding universe in Big Bang cosmology. Henrietta Swan Leavitt succumbed to cancer in 1921. And I might add that, in addition to overcoming the handicap or being a mere woman in a time of men, Henrietta Swan Leavitt was deaf.

Vera Rubin (born 1928)

Not all woman astronomers are historical figures. There are quite a few with us even as we speak, and Vera Rubin is one of them. Vera graduated from Vassar College in 1948 and applied for graduate study at Princeton University. She was turned down on the grounds that Princeton did not admit women to the graduate astronomy program (which they continued to not do until 1975). Princeton’s loss was Cornell’s gain and she graduated from Cornell with an M.A. degree in 1951, subsequently receiving her PhD from Georgetown University in 1954. If you like dark matter, then you will like Vera Rubin Too. Between 1970 and 1980, Vera Rubin’s published work nailed down the fact that stars & gas in the outer regions of spiral galaxies move too fast for the standard models to accommodate. There had to be considerably more mass than the luminous matter that we could see. Dark matter has become one of the major concepts in modern cosmology. In 1963 or 1964 (I can’t find out which year), Vera Rubin became the first woman to receive telescope time at Palomar Observatory, after being invited by Alan Sandage to observe either at Palomar or Mt. Wilson. And as I mentioned above, Vera Rubin became the first woman in 168 years to receive the Gold Medal of the Royal Astronomical Society, in 1996.

Jocelyn Bell Burnell (born 1943)

Born Jocelyn Bell, she married Martin Burnell in 1968. Jocelyn Bell graduated from the University of Glasgow in 1965 and became a graduate student at the University of Cambridge, from which she received her PhD in physics in 1969. While a graduate student she worked with her advisor, Anthony Hewish, to build a radio telescope to study quasars. In July, 1967, while observing with that telescope, she discovered a signal of such precise periodicity that it was at first thought to possibly be an extraterrestrial beacon. It was even provisionally labeled “LGM-1” (for Little Green Men). But in fact she had discovered the first pulsar, and went on to discover 3 more. The discovery paper was published in the 24 February 1968 issue of Nature. In 1973, Bell & Hewish shared the Michelson Medal from the Franklin Institute, for the discovery of pulsars. But the 1974

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Nobel prize in physics went to Anthony Hewish and Martin Ryle; the prize was not shared by Jocelyn Bell, and this has been a simmering controversy amongst astronomers ever since. Did she not receive a share of the prize because she was a student, a woman, or because the prize was a broader “lifetime achievement award” for Hewish & Ryle? Was it legitimate or not? The discussion is too long to worry over here. In any case, the discovery of pulsars was a major moment in the history of astronomy, and Jocelyn Bell Burnell deserves at least as much credit as anyone else, if not more, for that discovery. But she went on to receive the Beatrice M. Tinsley Prize from the American Astronomical Society in 1987, the Herschel Medal from the Royal Astronomical Society in 1989, and became a Fellow of the Royal Society in March 2003. In 1991, Jocelyn Bell Burnell was appointed Professor of Physics at the Open University in England, which doubled the number of female professors of physics in the United Kingdom.

I picked these 5 names to feature because each one seemed to hover around a moment of discovery in astronomy. And each one seems to tell a story about the role of women in astronomy. Some of you recognize names not here, but I can't do them all in a short bulletin article. Just remember that there are plenty of female role models for astronomy. Annie Jump Cannon (1863-1941) devised the scheme we use today for the spectral classification of stars (and, like Henrietta Swan Leavitt, was deaf). Williamina Paton Stevens Fleming (1857-1911) started out incognito as Edward Pickering's housekeeper, but eventually was appointed Curator of Astronomical Photographs at Harvard College Observatory, and placed in charge of a program to photograph the stellar spectra of the entire sky, the first woman to receive such a senior appointment. As the story goes, upset with the failures of a male assistant, Pickering exclaimed that his housekeeper could do a better job, and then proceeded to prove it. Cecilia Payne-Gaposchkin (1900-1979) received her PhD in astronomy in 1925, becoming the first person (male or female) to receive a PhD based on work done at the Harvard College Observatory. In 1956 she became a full professor at Harvard, and Chair of the Harvard Astronomy Department, the first woman to hold such a position not specifically designed for a woman. Sally Ride received her PhD from Stanford University, on a project measuring the absorption of X-rays from the Crab Nebula by the interstellar medium. In 1983 she became the first American woman to venture into space (her bachelor's degree was a double major in Physics and English, where she specialized in studying Shakespeare). Carolyn Shoemaker is no stranger to comet hunters. She has discovered more comets than anyone else, 32 so far, along with over 300 asteroids, and co-discovered comet Shoemaker-Levy 9, which famously slammed into Jupiter in 1994.

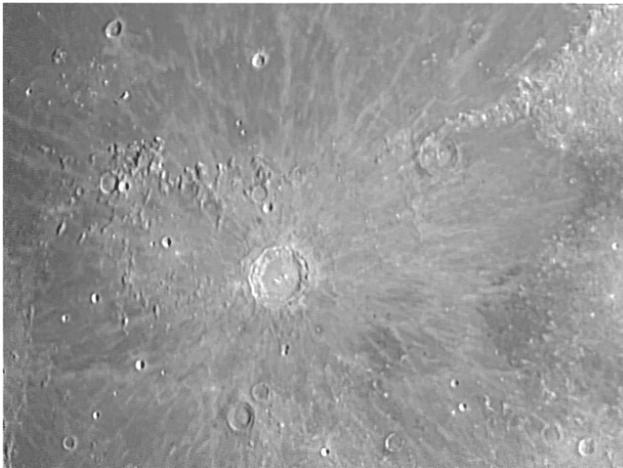
The list could go on, but I trust the point is made. Don't let the fact that you are a girl stop you from becoming an astronomer, or anything else, for that matter. ✧

Web Camera Imaging

By David Nakamoto

During the March 7th public star party, I used a Philips SPC 900 NC CCD-based web camera at the prime focus of my 127mm f/12 Orion Maktusov telescope. The SPC 900 is the successor to the Philips ToUCam, popular with astroimagers due to its good sensitivity, low noise, and relative ease by which it could be adopted for telescope use. The ToUCam has been discontinued for some time, and now the SPC 900 has also been discontinued; mine was one of only three for sale from Amazon. The ready availability of CMOS imagers are partially responsible for the lack of CCD-based web cameras. However, CMOS imagers are not inherently low in noise, and therefore for the low light level applications are not really suitable. For the low light work, CMOS imagers use special image processing techniques in the software, but there is still significant noise in the original images. And if you're going to do heavy processing to get results, you need to start off with as

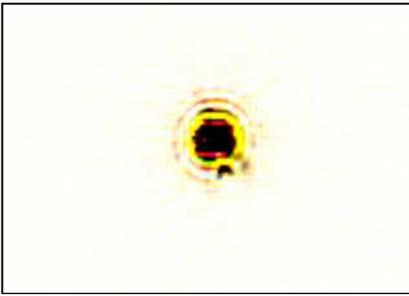
good a set of original images as possible.



This star party happened to be first light for this camera. In the tradition of acquiring new equipment, once I got the camera through the mail, it was cloudy or rainy for the next couple of weeks. Sorry about that everyone !

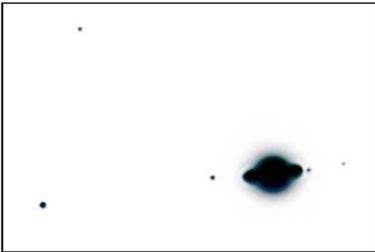
The first object was of course the moon. If the camera couldn't produce good images of the moon, it was hopeless. This image shows the crater Copernicus. I should add that the tremendous detail seen here is due primarily to the use of the wavelet filtering available on the program Registax, which also aligned and stacked the images. However, wavelet filtering is very sensitive to any small scale details in the image, including distortion due to the atmosphere, so stacking the images is necessary in order to reduce this noise before further processing is done.

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One other thing to keep in mind is that while stacking many images taken on a video camera can bring out details not visible through the telescope, it will not eliminate totally the effects of seeing and other atmospheric phenomenon such as clouds, fog, and haze. So for instance, this is a negative image of Rigil showing one of its companion stars in the 6 o'clock position. But there is another companion.

Seeing can often hide it, especially with our usually turbulent winter skies. Heavy processing through wavelet filters does show the suggestion of a companion at the 4 o'clock position, but the evidence is not straight-forward. Web cameras should be good at taking images of multiple stars, both for colorful combinations and to see fainter companions if they're not lost in the glare of the primary star, if the motion of the object in the camera's field of view is kept slow, say taking one to two minutes or longer to drift across.



The proof of the camera's sensitivity comes with Saturn. In the raw video, as the ringed planet rose in the night sky, I easily saw Titan and Rhea to one side, but a little later the seeing improved and I saw Tethys right off one end of the rings, and then sometime later Dione appeared further away. Both later disappeared as the seeing got worse, probably due to high altitude winds, which

are common in the Winter. But this was the first time I had seen either one in the raw video, suggesting that the camera and telescope combination can detect down to magnitude 10.3 per pixel. This image shows the four satellites; from left to right, Titan (mag 8.2), Rhea (9.6), Tethys (10.1), and Dione (10.3). The star in the upper left is not Iapetus, as I had hoped, but just a magnitude 9.7 field star.

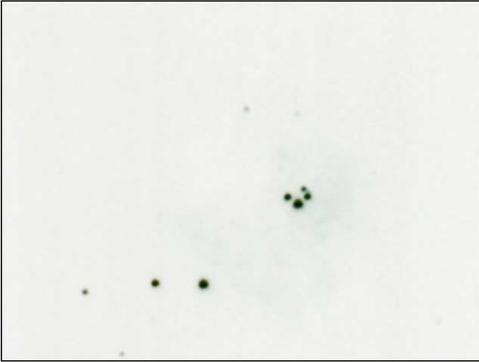
NOT visible is another field star that should be towards the lower left corner shining at mag 13.7. Also invisible but probably lost on the ring's glare is Enceladus at mag 11.6. This suggests that the lower limit of the camera is somewhere between 10.3 and 11.6.



This sensitivity also helps on Saturn

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itself, since it is faint enough that a long exposure ($1/10^{\text{th}}$ to $1/5^{\text{th}}$ of a second) is usually needed. The more sensitive the camera, the shorter this exposure time, which reduces the amount of atmospheric induced blurring that's captured with each individual image in the video.



However, even with this sensitivity, the camera is still not a deep sky object, at least not on extended or diffuse objects. This is because the light from such objects is spread out over a large area, making the magnitude PER PIXEL a lot fainter than the 10.5 magnitude limit derived from point-like objects like the Saturnian moons, as shown with this image of M42's

central region. The trapezium stars show off very well, but the nebula barely registered.

However, this suggests that the brighter and more condensed open and globular clusters might be fair game for this camera in its web video mode, since they consists of point-like objects. Also, it may be possible to take images without guiding, providing that the focal length isn't too long, keeping the drift in the FOV small from frame to frame, as I suggested earlier. I will investigate these options with a 10-inch f/4.5 Dobsonian, which has a focal length three quarters that of the Maksutov with 4 times the light grasp, so it should reach 1.5 magnitudes further down in faintness. I'll keep everyone posted ! ✧

New LAAS Jackets on the Way?

Michael White is looking into getting new LAAS jackets. The details are not too firm right now, but we're looking at thick warm fine-quality material in a price range of between \$100 to \$150, depending on the amount purchased. We need to know how many people are interested in ordering jackets so we can determine the volume and hence the price.

If you're interested, please email Michael at:
white837@aol.com

Or write to:
LAAS Jackets
P.O. Box 56084
Sherman Oaks, CA 91413

Griffith Observatory

Public Star Party Procedure

PJ Goldfinger handles our Griffith Observatory Public Star Party List. As patrons may drive up freely and reservations are no longer needed, we will continue to keep a sign up list for this event. Please note changes may occur in future PSP events and to read the policy below each month.

LAAS Members must still sign up on time - Deadline is no later than the Tuesday night prior to the Saturday GO Public Star Party each month. The list information required is:

- Your name, any LAAS Members and Non members in your car.
- Bring Telescope y/n.

NOTE: Those attending without a telescope as a favor will be required to be of some assistance if asked, needed and able.

It is primarily the main focus of any LAAS member who attends this event to be of Public Service with their telescopes in showing the patrons of Griffith Observatory the delights of the nighttime sky. New Members are not expected to adhere to this policy. Please feel free to come up and enjoy the event given you are signed up.

Parking will be on the east side of the Griffith Observatory Hill designated for GO employees. A guard will be stationed with the LAAS GO PSP list. It is always wise to have one's LAAS name badge and/or club ID on them just in case. Unloading telescope and equipment will remain the same procedure as well, with a drive up, drop off and park down hill routine.

The list currently has been updated to 30 spots for LAAS members. First come, first serve.

Please check the LAAS website and Yahoo list for changes and updates in any LAAS event, as there are many communication mediums and some are missed.

To sign up for the Griffith Observatory Star Party the email address is: laas.starparty@gmail.com. Attendance is only granted once a confirmation email has been received. Most important though is to have fun and enjoy! ✧

PJ Goldfinger

Outreach Program

Come on out to the school and show all the enthusiastic kids, parents, and teachers the night sky. They always appreciate it. And if you get WOW's when they look through you scope, you'll feel good. If no scope, come out anyway and help up set up or answer questions from the kids. So, Outreach volunteers, let's pitch in. I'm sure the kids and adults will appreciate our effort.

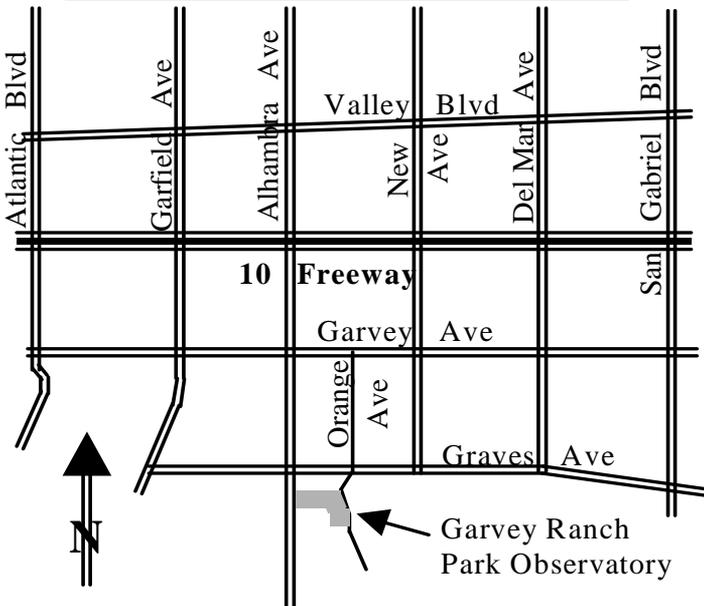
Thanks ! Outreach@laas.org (818) 891-3087 ✧

(Editors Note: Be aware that often these requests come with very little advanced notice. Therefore, we won't post any events in the bulletin unless it is more than a month away. The best way to get news of these events is to use the Internet and either join the LAAS Yahoo group or access the LAAS website. To join the LAAS Yahoo group, see page)

Don DeGregori

Map to Monterey Park Observatory

(The place to build your telescope)



LOANER CORNER



It might not look like it, but the spring and summer star parties are just around the corner. Now is the time for new members and existing members that would like to try out something new to check out one of the LAAS loaner telescopes. At the present time there are several available. All are fully equipped with a set of eyepieces. A simple collimating tool is included with all reflectors and a star diagonal is included with refractors.

LAAS-1: 4.5" f/8 Celestron reflector on a Polaris mount.



LAAS-2: 4.5" f/8 Tasco reflector on an Edmund equatorial mount with a clock drive. This telescope has been upgraded with a 1.25" focuser and 6x30 finder.

LAAS-4: 6" f/5 Telescopic reflector on a Dobsonian mount.

LAAS-6: 10" f/4.5 Discovery reflector on a Dobsonian mount. This fast telescope is also equipped with a Tele View Paracorr to correct off axis coma common with fast paraboloids.

LAAS-7: 80mm f/15 Meade refractor on an Orion Sky View Deluxe equatorial mount. This is an excellent instrument for the Moon and planets.

LAAS-8: 80mm f/11.4 Selsi refractor on an equatorial mount.

LAAS-9: 80mm f/6.25 refractor with University Optics objective on an equatorial mount. This fine Rich Field Telescope is good for going through the Messier Catalog.

For more information call: David Sovereign at (626) 794—0646. ✧

David Sovereign

LAAS-4

LAAS-2



EVENTS CALENDAR

Date	Event	Location and Information
Apr 4th (Sat)	Public Star Party	Griffith Observatory 2:00 pm to 10:00 pm See pg 12 for details on how to attend.
Apr 8th (Wed)	Board Meeting	Garvey Ranch Park Historical Museum Lounge area. 8:00 pm to 10:00 pm
Apr 13th (Mon)	General Meeting	Griffith Observatory Leonard Nimoy Event Horizon Theater Speaker Topic: TBD 7:45 pm to 9:45 pm
<i>Apr 18th (Sat)</i>	<i>New Member Party</i>	<i>Garvey Ranch Park See map page 13 5:00 pm to 10:00 pm</i>
Apr 25th (Sat)	Dark Sky Night	Lockwood Valley
May 2nd (Sat)	Public Star Party	Griffith Observatory 2:00 pm to 10:00 pm See pg 12 for details on how to attend.
May 6th (Wed)	Board Meeting	Garvey Ranch Park Historical Museum Lounge area. 8:00 pm to 10:00 pm
May 11th (Mon)	General Meeting	Griffith Observatory Leonard Nimoy Event Horizon Theater Speaker Topic: TBD 7:45 pm to 9:45 pm
May 23rd (Sat)	Dark Sky Night	Lockwood Valley
May 30th (Sat)	Public Star Party	Griffith Observatory 2:00 pm to 10:00 pm See pg 11 for details on how to attend.

LAAS Yahoo Group—how to join

The group is private, and therefore does not come up in a search. To join, send email to: LAAS-subscribe@yahoo.com. Include your full name so the moderator can verify your LAAS membership. Your full name is necessary so we can check our records to see if you really are a LAAS member. If approved, you will receive further instructions via email. ✧

Sky and Telescope Subscriptions

Sky and Telescope subscriptions renewals should be sent directly to Sky Publishing. To start a Sky and Telescope subscription, contact the LAAS Treasurer (see the contact information on page 2) directly to get the club rates, then thereafter send the renewal bills directly to Sky Publishing. ✧

Astronomy Magazine Subscriptions

For those that subscribe to Astronomy Magazine through the LAAS, the rate has gone up to \$34 a year, \$60 for two years. ✧



LAAS Home Page: <http://www.laas.org>
LAAS Bulletin Online: http://www.laas.org/Resources_Newsletter.htm

Membership Annual Dues:

Youth	\$ 20.00
Regular (18-65)	\$ 45.00
Senior Citizen (65 and up)	\$ 30.00
Senior Family	\$ 40.00
Family	\$ 60.00
Life	\$ 500.00
<i>Additional fees:</i>	
Charter Star member	\$ 30.00
Star member, with pad	\$ 70.00
Star member, no pad	\$ 60.00
Printed Bulletin	\$ 15.00

(Membership due date is indicated on the mailing label)

HANDY PHONE LIST



LAAS Answering Machine (213) 673-7355
Griffith Observatory
Program..... (213) 473-0800
Sky Report.....unavailable for now
Lockwood Site (661) 245-2106
(not answered, arrange time with caller.
Outgoing calls – collect or calling card)
Mt. Wilson Institute..... (626) 793-3100