



**Inside this issue**

Contact Information .....	2
Editor's Message .....	2
Public Star Party Information .....	3
Outreach News .....	4-5
Feature Article: The Great Nebula.....	6-11
Telescopes for Sale .....	13
Monterey Park Observatory Map.....	13
Loaner Corner .....	14
Events Calendar.....	15
LAAS Yahoo Group: How to Join.....	16
Sky and Telescope Club Subscriptions .....	16
Astronomy Subscriptions .....	16
New Members Coordinator Corner.....	16
Membership Information .....	16

**OUR 81st YEAR OF  
ASTRONOMY IN LOS  
ANGELES**

**Los Angeles Astronomical Society**  
Griffith Observatory  
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**Editor's  
Message**



Not much to write about this month. As usually happens, a month with a lot of activity is followed by one of relative quietness.

Which was the case for the February Lockwood star party. As shown by the images on pages 5 and 12, things were quiet up there, broken only by the crunch of ice and show underfoot, and the chattering of teeth.

But the February public star party was spectacular! Three satellites decided to become visual within 40 minutes of one another. The first was a -1 magnitude Iridium flare at 6:04pm. The second was the spy satellite that malfunctioned, passing overhead at 6:32 pm. The last was the International Space Station, fly above everyone's heads at 6:42 pm. After that, dew and cold settled in, but to see three very bright satellites passing nearly overhead, that was a treat!

My thanks to all who have contributed to the success of the bulletin. We always invite more input from members. Please consider writing or submit images. The deadline for submitting bulletin material is the 10th of each month. Please if possible submit electronically to BulletinEditor@laas.org

All other material may be sent to the

*(Continued on page 3)*

address listed at the top of the column at left, but timely reception and publication cannot be guaranteed. ✧

*David Nakamoto*

## *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](mailto: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*

### *Wed Feb 27th*

Time: 5:30–7 p.m.

School: Nestle Avenue Elementary School

Address: 5060 Nestle Ave., Tarzana 91305

Contact: Anna Donskoy (818) 462–5454 (mobile)

Exact location to set up: Basketball court, it has a lot of space. The entry gate is 10 yards from setup.

Security dimmed or off: Yes

AC outlet nearby: Yes

School will provide a bit of thank you food for astronomers?: Yes

### *Wed March 12th*

Time: 6:30–8:30 p.m.

School: Garfield Elementary

Address: 110 West McLean Street, Alhambra 91801

Contact: Sandie Cervantes - Cubscout Pack 223 Den Leader:

(626) 308–2661 from 8:00 a.m.–5:00 p.m.,

(626) 827–1532 (cell phone)

Exact location to set up: Gate on Second Street. You will see the playground off of Alhambra Road and Second Street. Alhambra Road is behind the school which is on McLean.

Security dimmed or off: Yes

AC outlet nearby: Contact said last year, we didn't need any. So be prepared with your own.

School will provide a bit of thank you food for astronomers?: Yes

### *Tues March 18th*

Time: 5–8 p.m.

School: Madrona Middle School

Address: 21364 Madrona Ave, Torrance 90503

Contact: Marissa Whitmore (310) 533–4562 ext. 8724

Exact location to set up: Back blacktop. Drive through back gate.

Security dimmed or off: Unknown

AC outlet nearby: Yes

School will provide a bit of thank you food for astronomers?: Yes

Map are available from the website, or contact Outreach (see below)

There you have it. 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 your 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, Don DeGregori,  
LAAS Outreach  
(818) 891-3087 ✧

*Don DeGregori*



The official LAAS snowman was built and photographed by Reggie Flores when he and his family tried to do an ice party instead of a star party up at Lockwood. But that's not an official LAAS cap on top of Frosty!

# The Winter Triangle

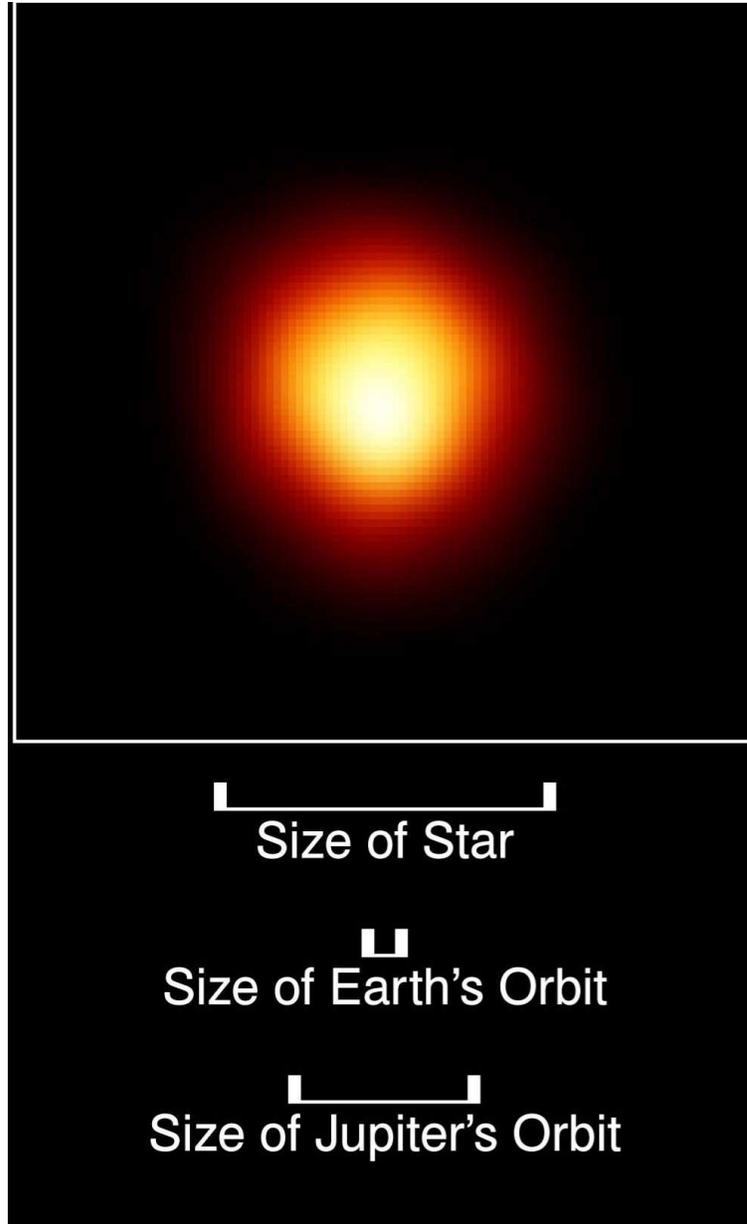
By Tim Thompson

Last August I featured the Summer Triangle. So, it's only fair that winter get equal time. There is, in fact, a winter triangle too. There is also a Winter Hexagon, but I only have room for 3 stars, so you are stuck with the triangle. Unlike the Summer Triangle, the Winter Triangle seems to have no history that I can uncover. I don't know who first drew the triangle, or called our attention to the triangle. It may even be some relatively modern invention, specifically designed to compete with its summer sibling. But considering the brightness of the stars, that seems unlikely.

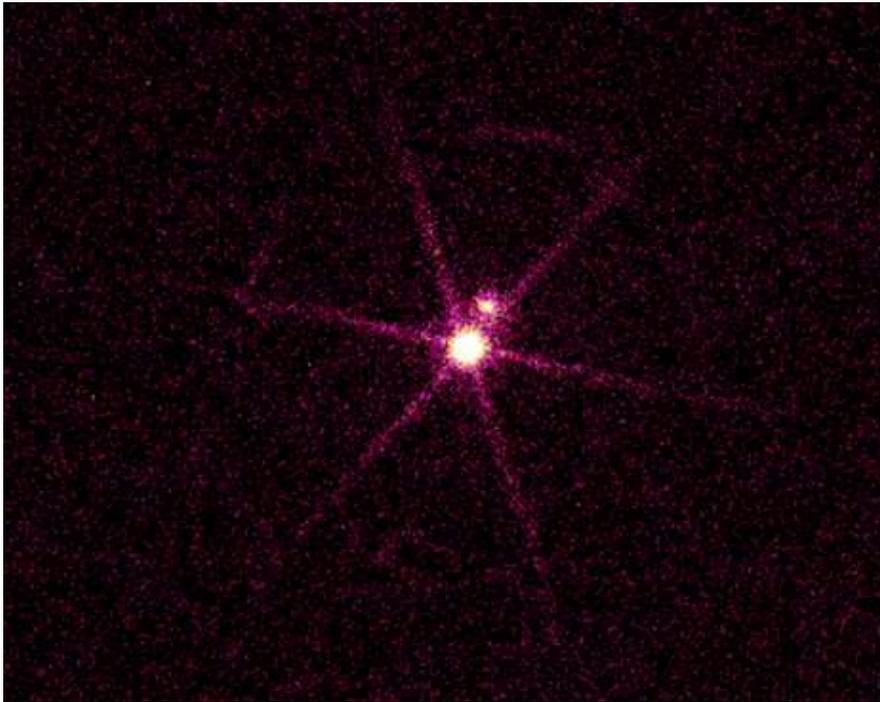
The Summer Triangle is made up of the 5<sup>th</sup>, 12<sup>th</sup>, and 19<sup>th</sup> brightest stars in the night sky, whereas the Winter Triangle is made up of the 1<sup>st</sup>, 7<sup>th</sup>, and 10<sup>th</sup> brightest stars in the night sky. So, even if the Summer Triangle is better known, the stars of the Winter Triangle are significantly brighter. The Summer Triangle is made up of 3 spectral class A stars, but the Winter Triangle is made up of stars from spectral classes A, F and M. The Summer Triangle is made up of 3 single stars, but the Winter Triangle has two stars with white dwarf companions. So maybe the Winter Triangle is both brighter and more interesting than the better known Summer Triangle.

**Sirius A** (a Canis Majoris) is the brightest star in the night sky, so obviously also the brightest star in the Winter Triangle. With an apparent magnitude of -1.46, Sirius appears to be about 18,586,800,000 times dimmer than the sun. But that's only because at a distance of 8.60 light years, it is 543,861 times farther away than the sun is. That makes Sirius the 9<sup>th</sup> star from Sol in distance, behind the a Centauri triple, Barnard's Star, Wolf 359 (where the dreaded Borg whipped Star Fleet), BD +36 2147, and the Luyten 726 double. Sirius has a photospheric temperature roughly 9900 Kelvins, so if you were right up close & face to face with Sirius, it would be no wimp, shining at you 25.4 times brighter than the sun. Sirius weighs in with about 2.12 solar masses, and a diameter about 1.7 times that of the sun. Sirius is a spectral class A0Vm or A1Vm star, where "A" is a blue star with photospheric temperature in the range 7,500-11,000 Kelvins, the "0" and "1" refer to hydrogen absorption line strength (0 being stronger than 1), "V" indicates a main sequence star (in astronomy jargon that means Sirius is a "dwarf" star, despite being rather larger than Sol), and "m" indicates unusually strong spectral lines from elements heavier than helium. In fact, Sirius is particularly rich, as stars go, in cadmium, titanium, iron and barium. The age of Sirius is poorly constrained, but in the range 200,000,000 to 250,000,000 years. We do normally call the star "Sirius", but perhaps you notice that I called in "Sirius A" at first. That's because there is more than one Sirius.

*(Continued on page 8)*



This HST ultraviolet image of Betelgeuse is sensitive to emission above the photosphere, and shows that if the chromosphere is included, Betelgeuse extends in size beyond the orbit of Jupiter.



This Chandra X-ray image of Sirius A & B shows that the two are similar in brightness in X-rays, unlike the HST visible image. This is primarily due to the very high temperature of Sirius B.

**Sirius B** is a white dwarf companion to Sirius A. Sirius B has a mass about 1.034 solar masses, but its diameter is slightly smaller than that of Earth, about 0.92 Earth diameters. That means Sirius B, like all white dwarf stars, is extremely dense; one cubic inch of Sirius B stuff would weigh about 15 tons on Earth. The presence of Sirius B was predicted in 1844 by the well known German mathematician Friedrich Wilhelm Bessel, as an explanation for the wobbly motion of Sirius A. Bessel's prediction was confirmed on January 31, 1862, when Alvan Graham Clark, son of the famous telescope maker Alvan Clark, observed Sirius B while star testing a new 18.5 inch refractor built for Dearborn Observatory. Stellar evolution theory tells us that a 1.034 solar mass white dwarf started out as a main sequence star about 7 solar masses, and took about 40,000,000 years to evolve into a white dwarf. Sirius B orbits Sirius A on an eccentric orbit with periastron at 1.8 AU and apastron at 31.5 AU and a period of 50.1 years. They were closest together in 1994, and they will be farthest apart in 2044. Some astronomers still see unpredicted variations in the motion of Sirius A & B which imply the presence of a second companion, Sirius C. But deep searches with the Hubble Space Telescope, which can easily see Sirius B, reveal

*(Continued on page 9)*

no sign of Sirius C, if there is one, at least down to the size of Jupiter. With apparent magnitude 8.3, Sirius B would be easily visible in any telescope, were it not for the glare of Sirius A. Although much hotter than Sirius A, at 24,800 Kelvins, Sirius B is so small it is nearly 10 magnitudes dimmer.

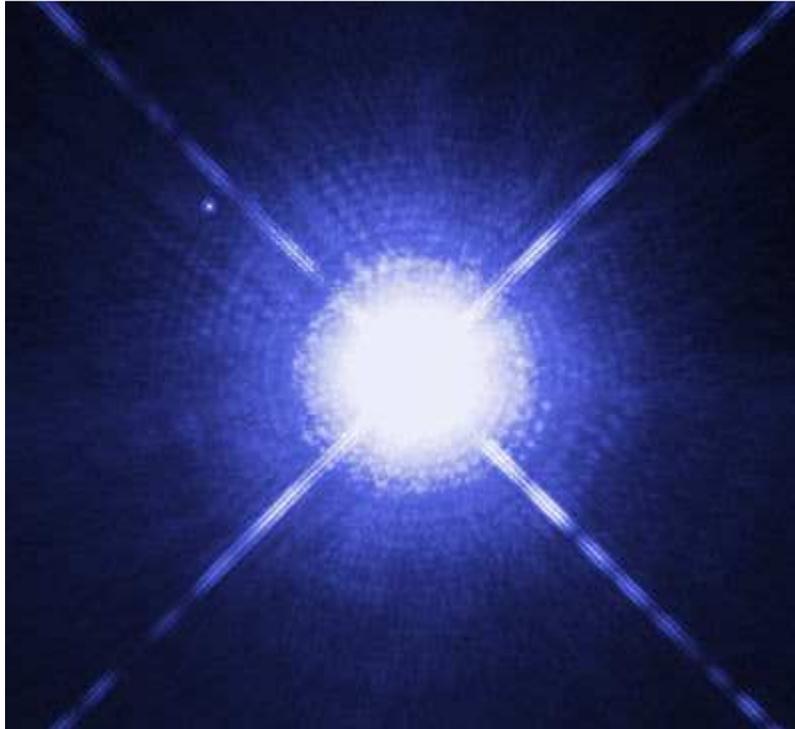
**Procyon A** (a Canis Minoris) is the 18<sup>th</sup> star (or the 14<sup>th</sup> star system) in distance from the sun, at 11.5 light years. With an apparent magnitude 0.38, Procyon is the 7<sup>th</sup> brightest star in the night sky, behind (in order of brightness) Sirius, Canopus, Rigel, Arcturus, Vega, Capella and Rigel. Much cooler than Sirius, Procyon is spectral class F5IV-V, where class F star temperatures range from 6,000 to 7,500 Kelvins, and the “IV-V” tells us it is either a subgiant or main sequence star. Its effective temperature of 6530 Kelvins supports a luminosity 6.9 times that of the sun. Procyon weighs in with 1.42 solar masses, and a radius 2.1 times the solar radius. Procyon is at or near the end of its main sequence lifetime, and is about to stop fusion of hydrogen in its core, and expand into a subgiant star. Much older than young Sirius, Procyon has been around about 3,000,000,000 years. And for all you purists out there, it’s “pro-see-on” in English, despite the fact that the Greek root is “pro-kee-on”, at least according to the Merriam-Webster online dictionary.

**Procyon B** is a white dwarf companion to Procyon A. Procyon B is rather lighter than Sirius B, at only about 0.6 solar masses. Its lower mass allows a larger radius, about 1.35 Earth radii, somewhat larger than Sirius B. It is also somewhat cooler than Sirius B, only about 7740 Kelvins. The small size of Procyon B points to a smaller progenitor than Sirius B, only about 2.1 solar masses. One cubic inch of Procyon B stuff would weigh only about 3 tons on Earth, as opposed to 15 tons for Sirius B stuff. More massive white dwarfs like Sirius B have outer layers dominated by hydrogen, the heavy elements having settled to the inner regions. But Procyon B has outer layers dominated by helium, the progenitor star having lost much of its hydrogen in strong stellar winds during its red giant phase. Bessel predicted the presence of Procyon B at the same time as he predicted Sirius B, and for the same reason, unexplained wobbles of Procyon A. Like Sirius B, Procyon B is on an eccentric orbit, with periastron at 8.9 AU and apastron at 21.0 AU, and a period of 40.8 years. With Periastron in 1967.86, we expect apastron at 2008.68, so if you are going to look for Procyon B, now is the time to do it, when it is at its maximum distance from Procyon A. But compare the apparent magnitude of Procyon B (10.82) with the apparent magnitude for Procyon A (0.38) and you can see there is a challenge involved in finding B in the glare of A.

**Betelgeuse** (a Orionis) is the 10<sup>th</sup> brightest star in the night sky, with a variable apparent magnitude about 0.5, most of the time. But unlike Sirius & Procyon, Betelgeuse is not a nearby star. In fact, it sits about 425 light years away, so that magnitude 0.5 translates into an intrinsic eyeball luminosity about 60,000 times that of the sun. Betelgeuse is so luminous because it is so large. It is a spectral class M red supergiant with a photospheric radius 600 times that of the sun!

*(Continued on page 10)*

That's 2.8 AU, which lies well beyond the aphelion distance for Mars (1.67 AU), and about the same distance as the main asteroid belt from the sun. In far ultraviolet light, which is sensitive to the corona & chromosphere, the radius of Betelgeuse extends as far as 35 AU, between the orbits of Neptune & Pluto. Betelgeuse is a single star comparable in size to our entire planetary system! Furthermore, Betelgeuse is losing as much as  $10^{-6}$  solar masses of gas every year, in a stiff stellar wind which has puffed up a circumstellar shell a third of a light year across. That wind has probably blown away about ½ of the original main sequence mass, but the red supergiant we can see weighs in with something between 12 and 20 solar masses (masses for lone stars are very hard to determine and very uncertain). Both Sirius & Procyon are destined to end their stellar lives as planetary nebulae and eventually as white dwarf stars. Since each already has a white dwarf companion, they will both become white dwarf binaries. But Betelgeuse is far too massive for such a quiescent fate; it will end its stellar lifetime in a supernova explosion, and likely leave behind a neutron star. Finally, it is most difficult to figure out how the word is supposed to be pronounced. The Merriam Webster online dictionary gives both "Beetle-juice" and "Betel-juice", the difference being a long or short "e". But our friend Sir Patrick Moore furiously insists on "Bet-el-jez", although that is a German based pronunciation. The word "Betelgeuse" is in fact a badly corrupted version of the original Arabic "Yad Al-Jawza". Try that one on your astronomy friends, and see if they can figure out which star it is. <sup>2</sup>





The image above, taken by Akira Fujii, shows Sirius at the bottom, Procyon to the left, and the conspicuously orange Betelgeuse near the center, along with the constellation of Orion.

The image at left was taken by the HST in visible light and shows Sirius A and its white dwarf companion Sirius B. Sirius A & B are similar in mass, but Sirius A is thousands of times brighter.



Reggie Flores and family tried to hold a star party up at Lockwood Valley, but wound up with an ice party. One does wonder though, how he managed to get past the gate show below.



## Telescopes for Sale

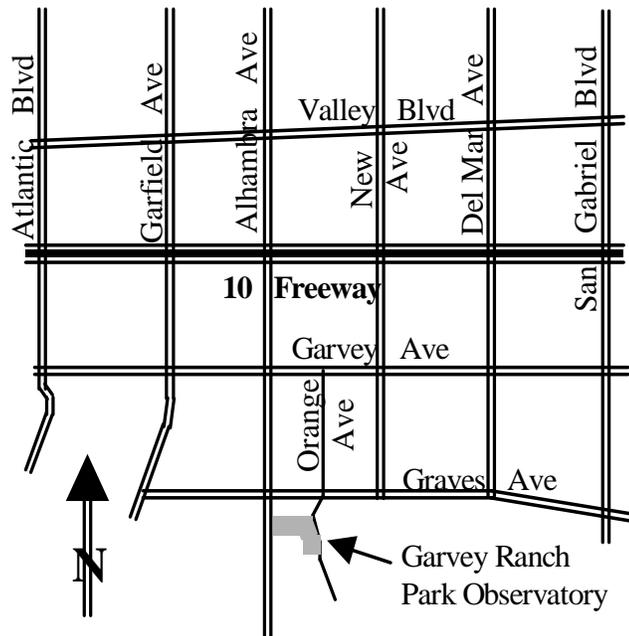
1st Telescope — New fully equipped 4" F/10 Celestron refractor w/finder scope, star diagonal, 2 Plossl eyepieces (25mm & 10mm), EQ3 mount, and a large sturdy wooden tripod. \$400.00. Contact Gabriel Reyna (323) 255—4346

2nd telescope — 10-inch F/5 Truss tube telescope in excellent condition w/ Telrad & Crayford Focuser. \$700.00. Contact Gabriel Reyna @ (323) 255—4346 (2)

12" Meade LX200GPS Schmidt-Cassegrain with autostar II hand control, includes extra filters and lenses, solar cover and scope buggy. \$3700  
Stacy Trevino— W- 909-5971904, H- 951-808-8784 (3)

## 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-4

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-2



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*

# EVENTS CALENDAR

Date	Event	Location and Information
Mar 8th(Sat)	Dark Sky Party	Lockwood Valley Check for weather conditions.
Mar 10th(Mon)	General Mtg	Griffith Observatory Speaker undetermined.
Mar 15th(Sat)	Public Star Party	Griffith Observatory. See pg 3 for details on how to attend.
Apr 5th (Sat)	Dark Sky Party	Lockwood Valley Check for weather conditions.
Apr 12th (Sat)	Public Star Party	Griffith Observatory. See pg 3 for details on how to attend.
Apr 14th (Mon)	General Mtg	Griffith Observatory Speaker undetermined.

The board meeting is held at 8pm on the Wednesday night prior to the general meeting, at Garvey Ranch Park. The Monday general meetings start at 7:30 pm unless otherwise noted. See each month's bulletin for updates.



LAAS Home Page: <http://www.laas.org>  
 LAAS Bulletin Online: [http://www.laas.org/Resources\\_Newsletter.htm](http://www.laas.org/Resources_Newsletter.htm)

## *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@yahoogroups.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 \$35 a year. ✧

## *New Members Corner*

Welcome to the Los Angeles Astronomical Society! Right now, we have lost our previous New Members Coordinator to college, so we're looking for someone to take over this position. If you're interested, please contact one of the board members on page 2. ✧

Email: <mailto:coordinator@laas.org> coordinator@laas.org

<b>Membership Annual Dues:</b>	
Youth	\$ 20.00
Regular (18-65)	\$ 35.00
Senior Citizen (65 and up)	\$ 20.00
Senior Family	\$ 30.00
Family	\$ 50.00
Group or Club	\$ 50.00
Life	\$ 500.00
<i>Additional fees:</i>	
Charter Star member	\$ 30.00
Star member, with pad	\$ 70.00
Star member, no pad	\$ 60.00

**(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