This is an image of approximately 48 x 66 degrees of the Milky Way in the Cygnus Constellation. Note the North American Nebula slightly to up and right of center. This is my first wide-field image and was taken with the camera mounted on top of my main telescope. See image details and issues below.

**Image Details:**
- **Lens:** Nikon 20mm f2.8
- **Camera:** Canon 20D Hutech Modified (Clear Filter)
- **Mount:** AP1200 (Piggyback)
- **Guiding:** FS-60C w/ ST402XME
- **2005-10-01/02 9:21 PM-12:29 AM**
- **Location:** Lockwood Valley, CA
- **Exposure:** 3 minutes x 49 frames = 147 minutes
- **ISO 1600**
- **RAW mode**
- **Focus – manually during daylight**

The stars in the corners are not round, especially in the upper left corner. There are several possibilities that I’m investigating. Also, setting black levels in the RGB channels is difficult.

Thanks for looking. ♥

Rick Wiggins

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Los Angeles Astronomical Society

BULLETIN

volume 79, issue 12  December 2005

**TELESCOPE LAYOUT**

*(NEWTONIAN REFLECTOR)*

By David Sovereign

This is the first in a series covering basic layouts of optical and mechanical components of telescopes. This article covers the Newtonian reflector. Due to its simplicity, the Newtonian reflector is perhaps the most common telescope design built and used by amateurs. The basic design was created in 1672 by Sir Isaac

*(Continued on page 5)*
Editor’s Message

December finds us seeing Mars slowly shrinking and moving away, the banquet just around the corner, and our annual Show and Tell at the general meeting.

For those that access the bulletin through the LAAS website, the past month saw the temporary disappearance of the LAAS website when the hosting service went down. Many thanks to Tim Thompson and Peter DeHoff for solving that problem.

Your friendly neighborhood editor’s email address has changed. Please send correspondence to: BulletinEditor@laas.org. Also send correspondence concerning bulletin printing and web site inquiries to the same address, addressed to Peter or Minghua.

I encourage everyone to contribute material for our bulletin; product reviews, reports on observing sessions, images and photographs, et al. Material can be sent to me through the email address BulletinEditor@laas.org. Floppy disks and CDs may be sent to the LAAS address or handed to me during the general meetings. Handwritten or typed material should be sent to the LAAS address, although timely delivery of such material to me is questionable, so anything time critical should be sent as early as possible. If at all possible, please send in material electronically through email. The account should be

(Date)  Event                  Location

Dec 3rd (Sat) Dark Sky Night  Lockwood Valley
Dec 10th (Sat) Public Star Party Griffith Observatory Satellite
Dec 12th (Mon) General Mtg Moon and Mars
Dec 31st (Sat) Dark Sky Night Lockwood Valley
Jan 7th (Sat) Public Star Party Griffith Observatory Satellite
Jan 22nd (Sun) Annual Banquet Moon, Mars, and Saturn
Jan 28th (Sat) Dark Sky Night Lockwood Valley

Membership Annual Dues:
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

Additional fees:
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)
Mars is past opposition, but it is still in good position for observing and Saturn is coming into view late at night. Orion is beginning to regain control of the winter nights. Although originally intended for our new members, any LAAS member can check out one of these fine instruments.

LAAS-1 - 4.5” f/8 Celestron reflector on a solid Polaris equatorial mount, equipped with Kellner eyepiece, two Orthoscopics, and collimation tool. These two 4.5” reflectors are good telescopes for beginners since both are small enough to be easily carried and set up, but with enough aperture to provide good views.

LAAS-2 - 4.5” f/8 Tasco reflector on a motorized Edmund equatorial mount, upgraded with 1.25” accessories, a 6x30 finder, and very solid wooden legs. It comes with three Kellner eyepieces and a collimation tool.

LAAS-4 - 6” f/5 reflector by Telescopics on a low Dobsonian mount, equipped with three Orthoscopic eyepieces.

LAAS-7 - 80mm f/15 Meade refractor on an Orion Sky View Deluxe equatorial mount, equipped with two Plossl eyepieces and an Orthoscopic. These two refractors are ideal to observe Mars during this opposition.

LAAS-8 - 80mm f/11.4 Selsi refractor on an equatorial mount, equipped with two Plossl eyepieces and an Orthoscopic.

LAAS-9 – 8” f/4.5 reflector on a Dobsonian mount that is motorized with a Dob Driver II. This has been taken off line to be sold. However if someone wants to check it out, it is still available.

There is also an upgraded 60mm f/15 refractor on a clock driven equatorial mount, with a 6x30 finder; accepts standard 1.25” accessories. It is not currently part of the loaner program, but it can be checked out by any member. It does not come with any eyepieces or diagonal.

For further information concerning these loaner telescopes call: David Sovereign at (626) 794-0646. ✤

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**THIS MONTH IN HISTORY**

**On December 2, 1934,** the molten glass was poured in Corning, N.Y. for the Hale 200-inch telescope mirror. The Pyrex glass was 2,700° F and was poured into a ceramic mold. The glass was cooled over a period of eleven months at one degree per day. It was then allowed to cool to room temperature. The 20-ton disk was shipped on March 26,1936 for grinding and polishing at the California Institute of Technology, completed on 3 Oct 1947. It was installed at the Mount Palomar Observatory, San Diego County, California, This was the last telescope Hale conceived of and help build.

**U.S. Naval Observatory, Dec. 6:** In 1830, the U.S. Naval Observatory, one of the oldest scientific agencies in the U.S., was established as the Depot of Charts and Instruments in Washington, D.C. Its primary mission was to care for the U.S. Navy's chronometers, charts and other navigational equipment. The first instrument installed was a 30-inch portable transit. Lieutenant Louis M. Goldsborough was the first officer in charge of the observatory, who served until 1833. Today, the U.S. Naval Observatory is the preeminent authority in the areas of time keeping and celestial observing; determining and distributing the timing and astronomical data required for accurate navigation and fundamental astronomy. (source)

In 1631, the transit of Venus occurred as first predicted by Kepler. He correctly predicted that an ascending node transit of Venus would occur in Dec 1631, but no-one observed it - due to the fact that it occurred after sunset for most of Europe. Kepler himself died in 1630. He not only predicted this particular transit but also worked out that transits of Venus involve a cyclical period of approximately 120 years. None occurred during the twentieth century, but one will happen 8 Jun 2004.

**On Dec 7th 1972,** Apollo 17, the sixth and last U.S. moon mission, blasted off from Cape Canaveral. Flight Commander Eugene Cernan was the last man on the moon. With him on the voyage of the command module America and the lunar module Challenger were Ronald Evans (command module pilot) and Harrison H. "Jack" Schmitt (lunar module pilot). In maneuvering Challenger to a landing at Taurus-Littrow, located on the southeast edge of Mare Serenitatis, Cernan and Schmitt activated a base of operations from which they completed three highly successful excursions to the nearby craters and the Taurus mountains, making the Moon their home for over three days. The mission returned on 19 Dec. ✤

Mary Brown
PRESIDENT’S PARAGRAPh

Dave Sovereign

The winter months are upon us that bring with them cold, clear nights to observe the domain of Orion and Taurus. They also bring snow, which effectively closes our Lockwood site for all but those who enjoy being really cold. This presents a time that we can build and upgrade our telescopes for the summer star party season. The LAAS operates a shop in Monterey Park that includes grinding and polishing tables to make a mirror as well as a lathe and milling machine to produce machine parts for a new mount or focuser. Our library is also located in Monterey Park and includes hundreds of books on astronomy, general science, and observing. There is also an observatory on the roof that houses an equatorially mounted 8” refractor donated by Joe Addison. For those who have not yet visited the facility, now is the time to remedy this.

Good Seeing 

December Elections

Remember that the general meeting in December is election time. We will take nominations at the beginning of the meeting and elect the new officers and board members.

If you would like to serve in one of these positions, you can volunteer or have a fellow LAAS member nominate you. Being an officer or board member means dedication and the willingness to take on extra responsibility. Requirements are:

1. An officer must have been a member for over 1 year and be over the age of 18.
2. A board member must have been a member for over 6 months and be over the age of 18.

2006 promises to be an exciting year, with the 80th anniversary of the LAAS and the return to the main Griffith Observatory.

David Nakamoto

“Shake-It” flashlight requires no batteries. It uses Faraday’s Principle of Magnetic Induction and a bright LED to produce light without batteries. A 30-second shaking can recharge the capacitor to produce enough energy to provide about 5 minutes of light.

Larry Guerra has also added a red filter behind the front lens and shield around the LED to make the flashlight night observing compatible. The flashlight come in two version, one is decorated with LAAS club name or Logo, one is undecorated. It is sold at $12 – profits go to the LAAS– (compare to $13-15, plus shipping online or $19 at Big 5 Sporting store, which comes without red filter, shield, or LAAS logo).

Orders can be placed by sending a check or money order in the amount of $12.00 + $2.00 S&H paid in the order of Rachel Llamas at P.O BOX 1320 SOUTH GATE, CA 90280

Map to Monterey Park Observatory

(The place to build your telescope)
Astronomical Puzzle

DECEMBER CONTEST
By Mary Brown

This month’s puzzler is again simple to state, but . . .

Two new moons were recently discovered orbiting Pluto. The 10th planet Xena has a moon and there are even some asteroids that have moons.

Therefore, how many moons are there in our Solar System as of November 2005? ∨

Rules:
1. Letters must be postmark by or before last day of the month.
2. Email also accepted by last day of the month: nwwrgz@yahoo.com
3. Winner will receive prize at the general meeting.
4. Winner will be selected from all correct answers by a drawing.
5. Only winner will be notified.
6. Correct answer will be in the following month’s bulletin.
7. Rules can be changed if necessary, notice will be given of any changes.

Along with your correct answer send us your name, address and phone number.

By mail send to:
Los Angeles Astronomical Society
4800 Western Heritage Way
Los Angeles, CA 90027

Good Luck! ∨

(Continued from page 1)
Newton, after whom the design is named. In a Newtonian telescope, the primary mirror is concave and is usually parabolic to correct for spherical aberration. The image is reflected off of a flat secondary mirror toward the front of the tube which reflects it to the side of the tube where it is viewed by an eyepiece which is held in a focuser. A few Newtonians include a corrector plate at the front of the tube. This will not be covered here. With the popular Dobsonian telescopes, the Term “Dobsonian” actually refers to the mount. The tube assembly is almost always a Newtonian.

The accompanying figure shows the optical layout of a Newtonian telescope. The dimensions are as follows:

- Do – Diameter of the primary mirror
- Ds – Diameter of the secondary mirror
- Fo – Focal length of the primary mirror
- S – Spacing between the primary mirror and the secondary
- Rt – Radius of the tube
- Ht – Height of the focuser above the tube to the center of travel
- A – Distance from the optical axis to the Newtonian focus

In a reflecting telescope the primary mirror is placed at the rear of the tube assembly in a cell that provides support for the mirror and has the capability to adjust the tilt of the mirror to align the optical axis of the mirror with that of the system. This adjustment process is called “collimation”, which is a separate subject. The inside diameter of the tube is usually 1 to 2 inches larger than that of the mirror depending of the size of the primary mirror. This allows the passage of air currents along the inner walls of the tube and reduces the effect of unwanted reflections. Near the front of the tube is a flat, usually elliptical,
secondary mirror that reflects the image to the Newtonian focus at the side of the tube. The secondary is held in a small cell that is supported by a structure called a spider. This holder is also adjustable to facilitate collimation.

The separation, S, between the primary and secondary is found by subtracting the distance, A, between the optical axis and the Newtonian from the focal length, Fo. A is the sum of the tube radius, Rt, and the height of the focuser to the center of travel, Hf. The diameter of the desired fully illuminated field, Df, is determined by the intended use of the instrument. A long focus telescope for planetary observation would require a small fully illuminated field of about ¼ inch to cover the field lens of a short focus eyepiece. A telescope for photographic use would require a larger field. With modern CCD imagers with small detector arrays would not require as large a field as a film camera.

An example of a telescope for moderately wide field observation of deep sky objects:

Diameter of primary mirror:
Do = 6"
Focal length of primary mirror:
Fo = 36" (f/6)
Assume that the 6” mirror would be placed in a 7” diameter tube with a tube radius, Rt, of 3.5”
Assume a focuser that is 3.5” tall above the tube surface.
Assume that a fully illuminated field diameter, Df, of ½” is desired.
The height of the Newtonian focus above the optical axis, A, would be:
3.5 + 3.5 = 7”.
The spacing between the primary and secondary, S, would then be:
36 – 7 = 29”.
Without going through the derivation, the diameter of the secondary is given by:
Ds = Df + ((A) x (Do - Df)) / Fo
In the example:
Ds = .5 + ((7) x (6 - .5)) / 36
or Ds = .5 + ((7) x (5.5)) / 36
Ds = .5 + (38.5) / 36
Ds = .5 + 1.07
This gives a secondary minor axis diameter of 1.57”. The closest standard size is 1.52”. To reduce the size of the secondary or enlarge the field, a low profile focuser can be used.

Aside from the equation to determine the size the secondary, the layout of a Newtonian is quite straightforward. It also helps to make a scale drawing of the telescope layout on graph paper. This design approach is valid for any size

The Voyager Mission to the Outer Planets and the Race to Interstellar Space

By his own admission, Tim Hogle is a chronic adventurer and amateur astronomer (OCA Charter member) who has turned to a life of spacecraft operations. In 1978, armed with a degree in electrical engineering and five years of experience flying Navy aircraft, Tim went to the Jet Propulsion Laboratory in Pasadena, California and signed up for three exciting years of space exploration with the Voyager mission to Jupiter and Saturn, which NASA had launched the previous year. He decided to stay.

Although Voyager was planned as a four-year mission, there was an option to send one of the twin spacecraft (Voyager 2) on to Uranus and Neptune if the Saturn encounters were successful and Voyager 2 was still healthy. In fact, even after Neptune in 1989 both Voyager 1 and 2 were so healthy that JPL and NASA had to figure out what to do with them next. And so the idea of a Voyager Interstellar Mission was conceived, with the objectives of studying the outer reaches of the heliosphere (the region of the sun's influence) and eventually crossing the boundary into interstellar space.

Although these spacecraft could theoretically continue providing unique science for another 30 years (until 2020), even at that time the most optimistic mission planners and engineers thought there was only a slim chance that the spacecraft would survive more than another ten years. But no one asked Tim what he thought. And Tim was discrete enough not to volunteer too much optimism, thereby maintaining a desirable impression of sanity.

Tim's official title is Voyager Spacecraft Systems Engineer, but he has been (and still is) very much involved with all aspects of spacecraft operations. By not succumbing to the usual temptation of moving on to glitzy new missions, he has gained a wide range of knowledge about the Voyagers.
Annual Banquet

The Monterey Room at Monterey Hills Restaurant is where we’ll meet in 2006 for our 80th banquet. The date is Sunday, January 22. We can start at 5PM. Speaker will probably be Tim Hogle from the Voyager project, if Dr. Ed Stone does not respond. Hopefully this will be confirmed by the next bulletin.

Address is:

3700 W. Ramona Blvd.
Monterey Park, CA 91754
(323) 264-8400
(323) 264-8426

Traveling north on the I-710 (Long Beach) freeway, exit on Ramona, just before the I-10 (San Bernardino) freeway. At the end of the offramp, continue straight ahead, uphill, and into the restaurant parking lot. Traveling east or west on the I-10 freeway, exit on Atlantic, go south to Garvey

(Continued on page 11)

The Sunspotter

By Luigi and Sergio (Fifth-Graders)

The sunspotter is a device for studying the sun. It is not safe to look directly at the sun. When we use a telescope, we need special additions to make it safe to look at the sun. With the sunspotter, we can study sunspots without endangering our eyes. The sunspotter is made of wood and glass, and looks like a sextant, but, it is not a sextant.

During June (2005), Mary Brown lent a sunspotter to our class. We used it daily to study sunspots. Each day, we would record data about sunspots by tracing the image thrown onto our papers by the sun through the sunspotter. The dark spots were the sunspots. Mary taught us how to calculate the movement of the sunspots after we traced the image. Unfortunately, when the day was overcast, we could not trace an image and so we could not record data. However, with Mary’s help, we were able to calculate how far our sunspots had moved in one week. We kept a chart of our data, which included information on the wind, temperature, and other conditions present at recording in our school play yard.

We learned that our recorded sunspots are not really moving, but that the sun is rotating. We learned, based upon our calculations, that it would take about twenty-four days for our sunspots to move to the edge of the sun shown on our paper, to travel around the parts of the sun we could not see, and to reappear again on the beginning margin of our paper. From this lesson, Mary helped us to understand that it takes about twenty-four days for the sun to complete a rotation. Sunspots appear darker than the rest of the sun because they are cooler areas than the areas of sun around them.

We recommend that other students use the sunspotter to study the sun. It is safe for us to use. It is fun to use. However, we found out that you need to work carefully, which is not always that easy. It is important to keep the data as correct as possible, and to record it right away. Getting the data and recording the data is interesting and makes us feel responsible. Students who use a sunspotter are really doing astronomy, and maybe will grow up to want to study space.

Thank you, Mary Brown! ✧

Newtonian telescope. The next installment of this series will cover Cassegrains and Gregorians. ✧

(Continued from page 6)
The Art of Observing
a Personal Perspective
By David Nakamoto
December 2005
Martian Musings

This past November, we were blessed with not one, but two nights with reasonably steady seeing, giving LAAS members and the public a good chance to see Mars. November 5th the dew stayed away all night, but on the 12th the air was a little heavy with humidity, and it didn’t take long for the dew to start accumulating. I was particularly worried about my laptop and kept checking it through the night, but the internally generated heat was enough to keep the dew drops away, and a dew shield attached to my Mak’s front end prevented dew at that end. Others were not so lucky. Jeff Schroeder appeared with his 11-inch aperture f/16 refractor, mounted on top of his Volvo station wagon! He forgot his dew shield, and by the end of the night at 10pm, his objective lens looked like it took a bath! A 5-inch Astrophysics refractor was also set up next to me, and the three telescopes made for an interesting comparison. The images on my laptop were of course larger, but they were also a lot fuzzier than the view through either refractor. The amount of detail seen was approximately the same, although it was easier to see and identify then on my laptop, or so a lot of people told me. In fact, other LAAS members sent people to my setup to get a better idea of what details they could see, or who had trouble seeing through the telescopes. So it was a tradeoff of image size and the ability to use both your eyes without straining, verses a sharper view of a smaller image of Mars. Six of one, half a dozen of another in my books. But then, I never thought my 5-inch Mak could match either refractor, but the images were complimentary.

Size isn’t everything when it comes to seeing or imaging planets. Take the image on the previous page. It was generated using video data taken on October 29th through the Caltech campus observatory’s C-14 operating at about f/24 or so. This observatory is plagued by bad seeing caused by its extremely poor location; it’s located on top of Robison Hall surrounded by a bunch of buildings! Millikan Library blocks the view to the North-east, while someone decided to place not one but TWO bright lights high up on adjoining buildings that shine light directly on the observatory! Therefore, despite the high magnifications possible, estimated to be around 900x in the above image, the video data shows a lot of distortion caused by the heat rising up from the buildings, as well as lack of
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(Continued on page 9)

The image is blurrier than it was however; it has been resampled at twice its original size.

Syrtis Major is the large marking looking like the head and beak of a large predatory bird. 600 of the “best” images from one of the video files were stacked. Many who have used this telescope believe that the optics are also not first rate, not an uncommon event with C-14s, as I learned by surveying LAAS members who have viewed through various examples of this telescope.

The image on the previous page was generated from video data taken on November 5th from the Griffith Observatory public star party using my 5-inch aperture Maksutov operating between f/36 and f/40. Around 600 images were selected and stacked to produce the “raw” image, then further processed to bring out details, including in this case “electronically” enlarging the image around 2x. Despite the blurring caused by over-sampling, the image holds up pretty well. The reason for enlarging the original image was NOT to generate more details from the image, but to make those already there easier to see. The seeing that night was pretty good, although not great, and a tremendous improvement over the conditions at Caltech, hence the final image is cleaner, proving that even with web cameras you need a good telescope with good seeing conditions in order to produce good final images.

Clear and Steady Nights! ♦
secondary mirror that reflects the image to the Newtonian focus at the side of the tube. The secondary is held in a small cell that is supported by a structure called a spider. This holder is also adjustable to facilitate collimation.

The separation, $S$, between the primary and secondary is found by subtracting the distance, $A$, between the optical axis and the Newtonian from the focal length, $F_o$. $A$ is the sum of the tube radius, $R_t$, and the height of the focuser to the center of travel, $H_f$. The diameter of the desired fully illuminated field, $D_f$, is determined by the intended use of the instrument. A long focus telescope for planetary observation would require a small fully illuminated field of about ¼ inch to cover the field lens of a short focus eyepiece. A telescope for photographic use would require a larger field. With modern CCD imagers with small detector arrays would not require as large a field as a film camera.

An example of a telescope for moderately wide field observation of deep sky objects:

- Diameter of primary mirror: $D_o = 6''$
- Focal length of primary mirror: $F_o = 36''$ (f/6)

Assume that the 6” mirror would be placed in a 7” diameter tube with a tube radius, $R_t$, of 3.5”

Assume a focuser that is 3.5” tall above the tube surface.
Assume that a fully illuminated field diameter, $D_f$, of ½” is desired.
The height of the Newtonian focus above the optical axis, $A$, would be:

$$A = 3.5 + 3.5 = 7''$$

The spacing between the primary and secondary, $S$, would then be:

$$S = 36 - 7 = 29''$$

Without going through the derivation, the diameter of the secondary is given by:

$$D_s = D_f + ((A) \times (D_o - D_f)) / F_o$$

In the example:

$$D_s = 0.5 + ((7) \times (6 - 0.5)) / 36$$

or

$$D_s = 0.5 + ((7) \times (5.5)) / 36$$

$$D_s = 0.5 + (38.5) / 36$$

$$D_s = 0.5 + 1.07$$

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(Continued on page 7)
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By Mary Brown

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Good Luck! ♦

(Continued from page 11)

So come out and hear Tim tell about the history and future of the Voyager mission, including some very exciting recent results. He has a personal view of the spell-binding excitement of first-ever planetary flybys, the suspense of anticipating the effects of unknown environments, never-before-attempted feats of navigational accuracy, the challenges of keeping these old robots going with string and baling wire for a quarter century after their warranty expired, and expectations for the future.

More info about the Voyager mission may be found at http://voyager.jpl.nasa.gov.

(Continued on page 6)
December Elections

Remember that the general meeting in December is election time. We will take nominations at the beginning of the meeting and elect the new officers and board members.

If you would like to serve in one of these positions, you can volunteer or have a fellow LAAS member nominate you. Being an officer or board member means dedication and the willingness to take on extra responsibility. Requirements are:

1. An officer must have been a member for over 1 year and be over the age of 18.
2. A board member must have been a member for over 6 months and be over the age of 18.

2006 promises to be an exciting year, with the 80th anniversary of the LAAS and the return to the main Griffith Observatory. 

David Nakamoto

PRESIDENT'S PARAGRAPH

Dave Sovereign

The winter months are upon us that bring with them cold, clear nights to observe the domain of Orion and Taurus. They also bring snow, which effectively closes our Lockwood site for all but those who enjoy being really cold. This presents a time that we can build and upgrade our telescopes for the summer star party season. The LAAS operates a shop in Monterey Park that includes grinding and polishing tables to make a mirror as well as a lathe and milling machine to produce machine parts for a new mount or focuser. Our library is also located in Monterey Park and includes hundreds of books on astronomy, general science, and observing. There is also an observatory on the roof that houses an equatorially mounted 8” refractor donated by Joe Addison. For those who have not yet visited the facility, now is the time to remedy this.

Good Seeing ✫

Map to Monterey Park Observatory

“Shake-It” flashlight requires no batteries. It uses Faraday’s Principle of Magnetic Induction and a bright LED to produce light without batteries. A 30-second shaking can recharge the capacitor to produce enough energy to provide about 5 minutes of light.

Larry Guerra has also added a red filter behind the front lens and shield around the LED to make the flashlight night observing compatible. The flashlight come in two version, one is decorated with LAAS club name or Logo, one is undecorated. It is sold at $12 – profits go to the LAAS – (compare to $13-15, plus shipping online or $19 at Big 5 Sporting store, which comes without red filter, shield, or LAAS logo).

Orders can be placed by sending a check or money order in the amount of $12.00 + $2.00 S&H paid in the order of Rachel Llamas at P.O BOX 1320 SOUTH GATE, CA 90280

Page 4

Page 13

Vol 79, issue 12
Mars is past opposition, but it is still in good position for observing and Saturn is coming into view late at night. Orion is beginning to regain control of the winter nights. Although originally intended for our new members, any LAAS member can check out one of these fine instruments.

LAAS-1 - 4.5" f/8 Celestron reflector on a solid Polaris equatorial mount, equipped with Kellner eyepiece, two Orthoscopics, and collimation tool. These two 4.5" reflectors are good telescopes for beginners since both are small enough to be easily carried and set up, but with enough aperture to provide good views.

LAAS-2 - 4.5" f/8 Tasco reflector on a motorized Edmund equatorial mount, upgraded with 1.25" accessories, a 6x30 finder, and very solid wooden legs. It comes with three Kellner eyepieces and a collimation tool.

LAAS-4 – 6” f/5 reflector by Telescopics on a low Dobsonian mount, equipped with three Orthoscopic eyepieces.

LAAS-7 – 80mm f/15 Meade refractor on an Orion Sky View Deluxe equatorial mount, equipped with two Plossl eyepieces and an Orthoscopic. These two refractors are ideal to observe Mars during this opposition.

LAAS-8 – 80mm f/11.4 Selsi refractor on an equatorial mount, equipped with two Plossl eyepieces and an Orthoscopic.

LAAS-9 – 8” f/4.5 reflector on a Dobsonian mount that is motorized with a Dob Driver II. This has been taken off line to be sold. However if someone wants to check it out, it is still available.

There is also an upgraded 60mm f/15 refractor on a clock driven equatorial mount, with a 6x30 finder; accepts standard 1.25" accessories. It is not currently part of the loaner program, but it can be checked out by any member. It does not come with any eyepieces or diagonal.

For further information concerning these loaner telescopes call: David Sovereign at (626) 794-0646. ✩

David Nakamoto

**THIS MONTH IN HISTORY**

**On December 2, 1934**, the molten glass was poured in Corning, N.Y. for the Hale 200-inch telescope mirror. The Pyrex glass was 2,700º F and was poured into a ceramic mold. The glass was cooled over a period of eleven months at one degree per day. It was then allowed to cool to room temperature. The 20-ton disk was shipped on March 26,1936 for grinding and polishing at the California Institute of Technology, completed on 3 Oct 1947. It was installed at the Mount Palomar Observatory, San Diego County, California, This was the last telescope Hale conceived of and help build.

**U.S. Naval Observatory, Dec. 6:** In 1830, the U.S. Naval Observatory, one of the oldest scientific agencies in the U.S., was established as the Depot of Charts and Instruments in Washington, D.C. Its primary mission was to care for the U.S. Navy’s chronometers, charts and other navigational equipment. The first instrument installed was a 30-inch portable transit. Lieutenant Louis M. Goldsborough was the first officer in charge of the observatory, who served until 1833. Today, the U.S. Naval Observatory is the preeminent authority in the areas of time keeping and celestial observing; determining and distributing the timing and astronomical data required for accurate navigation and fundamental astronomy. (source)

In 1631, the transit of Venus occurred as first predicted by Kepler. He correctly predicted that an ascending node transit of Venus would occur in Dec 1631, but no-one observed it - due to the fact that it occurred after sunset for most of Europe. Kepler himself died in 1630. He not only predicted this particular transit but also worked out that transits of Venus involve a cyclical period of approximately 120 years. None occurred during the twentieth century, but one will happen 8 Jun 2004.

On Dec 7th 1972, Apollo 17, the sixth and last U.S. moon mission, blasted off from Cape Canaveral. Flight Commander Eugene Cernan was the last man on the moon. With him on the voyage of the command module America and the lunar module Challenger were Ronald Evans (command module pilot) and Harrison H. "Jack" Schmitt (lunar module pilot). In maneuvering Challenger to a landing at Taurus-Littrow, located on the southeast edge of Mare Serenitatis, Cernan and Schmitt activated a base of operations from which they completed three highly successful excursions to the nearby craters and the Taurus mountains, making the Moon their home for over three days. The mission returned on 19 Dec. ✩

Mary Brown
December finds us seeing Mars slowly shrinking and moving away, the banquet just around the corner, and our annual Show and Tell at the general meeting.

For those that access the bulletin through the LAAS website, the past month saw the temporary disappearance of the LAAS website when the hosting service went down. Many thanks to Tim Thompson and Peter DeHoff for solving that problem.

Your friendly neighborhood editor’s email address has changed. Please send correspondence to: BulletinEditor@laas.org. Also send correspondence concerning bulletin printing and web site inquiries to the same address, addressed to Peter or Minghua.

I encourage everyone to contribute material for our bulletin; product reviews, reports on observing sessions, images and photographs, et al. Material can be sent to me through the email address BulletinEditor@laas.org. Floppy disks and CDs may be sent to the LAAS address or handed to me during the general meetings. Handwritten or typed material should be sent to the LAAS address, although timely delivery of such material to me is questionable, so anything time critical should be sent as early as possible. If at all possible, please send in material electronically through email. The account should be

(Continued on page 3)
This is a image of approximately 48 x 66 degrees of the Milky Way in the Cygnus Constellation. Note the North American Nebula slightly to up and right of center. This is my first wide-field image and was taken with the camera mounted on top of my main telescope. See image details and issues below.

Image Details:
Lens = Nikon 20mm f2.8
Camera = Canon 20D Hutech Modified (Clear Filter)
Mount: AP1200 (Piggyback)
Guiding: FS-60C w/ ST402XME
2005-10-01/02 9:21 PM-12:29 AM
Location: Lockwood Valley, CA
Exposure: 3 minutes x 49 frames = 147 minutes
ISO 1600
Focus – manually during daylight

The stars in the corners are not round, especially in the upper left corner. There are several possibilities that I’m investigating. Also, setting black levels in the RGB channels is difficult.

Thanks for looking. ✯

Rick Wiggins

This is the first in a series covering basic layouts of optical and mechanical components of telescopes. This article covers the Newtonian reflector. Due to its simplicity, the Newtonian reflector is perhaps the most common telescope design built and used by amateurs. The basic design was created in 1672 by Sir Isaac

Inside this issue:
Telescope Layout, Newtonian Reflector .................................................. 1,5-7
Your Friendly Neighborhood Editor .................................................. 2,3
On this Month in History ........................................................................... 3
December Elections (message) ................................................................. 4
President’s Paragraph .............................................................................. 4
The Sunspotter ............................................................................................ 7
The Art of Observing—Martian Musings .................................................. 8-10
80th Annual Banquet .................................................................................. 10-12
Astronomy Puzzler .................................................................................... 12
“Shake It” flashlight ................................................................................... 13
Monterey Park Observatory Map ............................................................ 13
Loaner Corner ......................................................................................... 14-15
Events Calendar ....................................................................................... 15
Membership Information .......................................................................... 15
Cygnus Wide-angle (image) ..................................................................... 16

Notes, corrections, questions, ideas, articles? All are welcome at:
BulletinEditor@laas.org.