

The Official Publication of the Lehigh Valley Amateur Astronomical Society https://lvaas.org/ https://www.facebook.com/lvaas.astro July 2021





The Board has completed the final changes to the LVAAS By-Laws. The revised By-Laws were presented to the entire Board and approved on June 27, 2021. The new By-Laws will be presented to the membership for

approval at the next General Meeting. I would like to thank all Board members for their hard work in completing this difficult task. After approval, the Board will work on completing a Strategic Plan for LVAAS's future. Preston Smith, who has a lot of experience in creating Strategic Plans for the U.S. Military, is assisting us in this effort.

The following Board positions remain open. Please contact me at director@lvaas.org if you are interested in helping the club:

- Star Party Coordinator
- Member Services

Pennsylvania state Covid Guidelines have changed as of June 28th and are the following:

- No restrictions for people who are vaccinated.
- Masks and social distancing are recommended but not mandatory for persons who have not been vaccinated.
- Individual organizations can set their own restrictions.
- Pennsylvanians aged 12 and over are now eligible for the COVID vaccine.

The Board reviewed and discussed the state guidelines and on a close 7-6 vote decided to continue with our current restrictions and to be in alignment with the state guidelines. Those restrictions are:

- Events will be held for LVAAS Members Only
- No restrictions for people who are vaccinated
- Masks and social distancing are recommended but not mandatory for persons who have not been vaccinated.
- While the building will be opened to use the restroom and look around, the Star Parties will not have planetarium shows and the Red Shift will not be open. We will make drinks and snacks available.
- Observatories that are open will have alcohol swabs available to wipe down the equipment and viewers will only be allowed in the building one at a time. Others are asked to wait outside the Observatory until it is their turn.

In line with the above restrictions the following events were held at the South Mountain Site over the past month:

- An Astroimaging meeting was held on June 19th with 12 members in attendance. Tom Duff demonstrated mount setup including astronomical north alignment, leveling, mount installation and balancing. Bill Dahlenburg set up his mount, demonstrated camera installation and tested projecting images on the observatory wall. This will be used for future meetings to allow outside viewing.
- Star Party, June 26th A Star Party was held on June 26th. Twelve members and two reporters from Channel 39 radio were in attendance. We opened the main building, the six inch refractor observatory, the Brooks fourteen-inch Meade SCT observatory, and the 12 inch Cassegrain roll-off observatory for members to tour. Earl Pursell did a Planetarium show for one family of 3 as a special request. The sky was not cooperative, so no viewing of the stars was done. Megan from Channel 39 interviewed several members in attendance and wants to come back when we have a full Star Party, so she can interview more members and the public. We gave her a tour of our facilities and Earl set up the Planetarium so we could give Megan an example of dark skies versus our light-polluted skies.

Ad Astra!

Thomas Duff

Minutes from the LVAAS General Meeting – June 13, 2021

The June 2021 LVAAS General Meeting General Meeting was conducted electronically using an on-line service in an effort to adhere to the social distancing guidelines with regard to the COVID-19 pandemic.

Approximately 30 people were in attendance.

Director Tom Duff opened the meeting at 7:00 PM.

The General Meeting's presentation was Finding My Place in the Universe by Jessica Mink. Finding My Place in the Universe is the story of the professional life of an astronomer whose scientific interests range from the origins of life to the structure of the universe, across orders of magnitude of size and distance in time and space, and whose main contributions have been tools to help other astronomers and astrophysicists understand their data.

Jessica Mink has been a positional astronomer and developer of astronomical tools, data pipelines, and archives at the Smithsonian Astrophysical Observatory for over 30 years, working with data from ground-based (and one space-based) telescopes. Between her MIT BS and MS degrees and this job, she was involved in solar system optical spectroscopy, high-speed occultation photometry, and the geometrical astronomy and catalog development needed to predict the occultations she observed with her colleagues. Her life story is complicated by the fact that she has spent the last decade of her life in a different gender than she spent the first six decades.

Treasurers Report: Gwyn Fowler

Here is an update to fund balances that have changed since the April general meeting. Details were not provided at the May 1st meeting, so the transactions up to May 1st and between May 1st and today are shown separately. Much of our income for FY 2021 has been received. Expenses yet to be realized include insurance (about \$7,000), and a contribution to the roof fund (about \$4,000), plus additional expenses for ongoing operations including maintenance and utilities.

	11 Apr 2021	11 Apr 2021IncomeExpense		1 May 2021	
General	47,535.82	398.63	751.33	47,183.12	
Red Shift	286.00	0.00	8.47	277.53	

Fund Activity Between April and May Meetings (amounts in dollars).

Fund Activity Since May Meeting (amounts in dollars).

	1 May 2021	Income	Expense	13 June 2021
General	47,183.12	776.76	676.97	47,283.21
Red Shift	277.53	38.00	0.00	315.53

The following table summarizes our annual budget so far this fiscal year.

FY 2021 General Fund Budget (amounts in dollars).

	Budget	Actual
Income	20,000.00	17,275.22
Expense	26,565.00	6,616.90
Net	-6,565.00	+10,658.32

Membership: Gwyn Fowler

- 2nd readings
 - o Jamie Elovski
- 1st readings
 - o none

General Comments:

Director's Comments: Tom Duff

- The state of Pennsylvania has decided to lift many pandemic restrictions as of May 31st. In line with this change LVAAS has decided to open up some activities for its members.
- The BOG has approved the following activities for LVAAS Members Only at the South Mountain site:
 - Astro Imaging Meeting June 19th 7pm
 - \circ Star Party June 26th 7pm
 - \circ LVAAS Picnic July 10th
 - Star Party July 17th 7pm
 - Star Party August 14th 7pm

Note: These events will be held for LVAAS Members Only with the following restrictions:

Masks and Social Distancing are required as per Pennsylvania state requirements in force at the time of the event.

While the building will be open to use the bathroom and look around, the Star Parties will not have Planetarium Shows, there will be No Speaker Presentation, and the Red Shift will not be open. We will make drinks and snacks available outside the building.

Observatories that are open will have alcohol swabs available to wipe down the equipment and viewers will only be allowed in the building one at a time. Others are asked to wait outside the Observatory until it is their turn.

Pulpit Rock Observatories: Frank Lyter

- Setup instructions for connecting computers to the 12-inch Meade LX200 Classic telescope located in the Pulpit Rock Spacek roll-off observatory. A USB cable is located in the desk area for connecting any computer to the telescope.
- We have a Raspberry PI computer that we have been testing at the last several meet-ups but it won't be permanently installed for a couple of weeks. Feel free to install Stellarium on your own laptop and connect to the telescope for navigating the night sky.
- Stellarium is a free, open source application that installs on Windows or Linux-based computers and is very easy to use once you have a couple of pointers http://stellarium.org/
- If you have any questions, please let me know. We will continue to update this instruction document and suggestions / updates are welcome.

Next General Meeting and LVAAS Summer Picnic:

• The LVAAS Summer Picnic and next General Meeting will be Saturday, July 10th, 2021. The rain date will be Sunday, July 11th. Please check the website to verify start date and time. If you plan to attend the Members Only Picnic, please complete the survey that has been sent to you so LVAAS knows expected attendance and what to purchase for the picnic.

The June General Meeting was recorded.

The meeting was adjourned at approximately 8:30 PM.

Submitted by Dennis Decker, Secretary

Via NASA: While we wait to hear some hopefully good news on the reawakening of our favorite space telescope, Hubble, why not have fun with some of these online activities while thinking happy thoughts and sending get well wishes!

https://www.nasa.gov/content/hubble-inspires-online-activities



Via Ron Kunkel:

The video recording of Dr. Ruth Daly's presentation "<u>An Overview of Black Holes in Galaxies Across</u> <u>the Universe</u>", from this year's 9th Annual George J. Losoncy Lecture in Physics and Astronomy is available on Professor Daly's website:

https://sites.psu.edu/rdaly/april-9-2021-9th-annual-losoncy-public-lecture/

Via Earl Pursell: NEAF : The Virtual Experience - Livestream Link: https://www.youtube.com/embed/KP-GPuHc3BI

Via Earl Pursell, UACNJ Liason: Presentations through October 2021

UACNJ provides FREE public programs at our Observatory in Jenny Jump State Forest from April through October on Saturday evenings. For the safety of the public and our volunteers, we will be operating the observatory much as we did last year: the entire event will be held outdoors with masks and social distancing required. Weather permitting, an astronomy presentation begins at 8 p.m. As you will be outdoors, please bring a chair or blanket to sit on and be prepared for cool weather. The presentation is followed by some stargazing and we will have screens set up to show live video from the observatory's telescopes until 10:30 p.m. These public programs are free but donations are appreciated. Note admission is limited and by reservation ONLY. For more information and free registration see our website: http://www.uacnj.org/index.php. Reservations for the following week's program go on sale Sunday at 12 noon. Please join us or watch our presentations online by subscribing: youtube.com/UACNJ

Benefit from giving to LVAAS through your IRA!

If you are 70 1/2 or older, you can make a charitable gift directly from your IRA to LVAAS without paying income tax on the withdrawal. State laws about Qualified Charitable Deductions (QCDs) and how QCDs are handled vary. If interested, please consult an adviser so you can help LVAAS today! https://lvaas.org/page.php?page=using_rmd_to_support_lvaas



Cover image: Partial (Annular) Solar Eclipse June 10, 2021. Like many other amateur astronomers, Peter Detterline changed his plans to view the eclipse due to the forecast of poor viewing conditions, although for him that sadly meant canceling a party. Peter persevered however, and managed to capture this lovely image early on the morning of June 10. Thanks for sharing your prize, Peter! *More eclipse images starting on page 22.*

LVAAS General Meeting: Saturday, July 10 at 5:00 p.m. Raindate: Sunday, July 11

Meeting will be via Zoom, and also in person at South Mountain for Members Only. Presentation will be at 8:30 p.m. <u>ON SATURDAY ONLY.</u> Questions? Please email Gwyn Fowler at membership@lvaas.org

Speckle Interferometry of Double Stars

presented by Clif Ashcraft



Speckle interferometry is geared for the serious observer who wants to work with the professionals in the area of double star observations and publish their observations.

Some math is involved but only in discussing what the software does, not what the user actually needs to get into.

The work I did was done with my 11 SCT and the same little video camera I use for planetary imaging. Most serious amateurs already have the equipment they need.

According to Clif, he became an astronomer on August 26, 1942 when his mom let him stay up past 11 p.m. to watch a total lunar eclipse. Clif went to high school in Loveland Ohio, got his BS in Chemistry from the University of Cincinnati and earned his PhD in Organic Chemistry from the University of California at Berkeley. Clif went to work at Union Carbide, where for 40 years he did work on polymer synthesis, advanced rocket propellants, coupling agents for mineral filled thermoplastics, voltage stabilized polyethylene for buried power cables, and cycloaliphatic epoxides. After his retirement in 2003, Clif became a full-time amateur astronomer and amateur telescope maker.

Clif's 7.25" f/14 Schupmann Medial is his favorite telescope, but he also has a C11, C14, and a 12.5" Newtonian. His work has concentrated on Lunar and Planetary Imaging and the measurement of double stars for which he has several papers in the *Journal of Double Star Observations*. Recently Clif learned to use the technique of live stacking of deep sky objects using the tool in SmartCap. This allows one to obtain moderately long exposures without guiding.



~ FOR SALE ~

~Celestron 9.25 SCT on an Orion Atlas EQ-G. Asking \$2000

The EQ-G mount is two years old with not even 20 hrs on it. I have a 14" dob I use mostly. I also have a CGEMII go-to mount. The Celestron 9.25 I bought from an elderly gentleman in my neighborhood. It is in mint condition. It comes with a telrad, dew shield, dew strap that fits around the corrector. It has a 8x40mm finder scope. Also comes with a William optics 2" diagonal with 1.25" adapter plus focuser.

Please contact Jeff Lovaasen jdlovaasen@icloud.com



Night Sky Notebook For JULY by Peter Detterline





From the LVAAS Archives:

First Leight, The Story of a Remarkable Man and a Forgotten Scope

by Sandy Mesics and Bob Mohr

In 2006, during my tenure as Director I attempted to get "up to speed" with LVAAS facilities and projects, to see what needed doing regarding maintenance. The late Les Miller remarked that the door on the "dog house" shed under the steps to the Knecht Observatory needed repair, and he volunteered to do it. I had heard that the shed was originally built to house a large telescope that could be rolled out to observe, but I had never seen this scope, and long-time members I had asked about it had vague recollections about it, but not a lot of solid information. Feeling like intrepid investigators, Les and I figured out how to open the door to the shed, not an easy task: the only way to open the shed was by yanking on a chain inside the optical shop, which pulled open a latch inside the dog house. It was an elegant, simple security solution, typical of LVAAS ingenuity.

Indeed, when we opened the door, we found not only a telescope, but a tale of its maker, over 50 years of LVAAS history, and an unfulfilled dream.

The Telescope Maker

Walter Weaver Leight was an early member of LVAAS, and an accomplished telescope maker. In amateur telescope making circles he was noted for his innovative and original designs. Former LVAAS member and prolific author Rodger Gordon said that Leight "was perhaps the most remarkable amateur astronomer this writer has ever known." During his lifetime he built 21 telescopes and made the optics for 19 of these. Leight was mentored on telescope making by John Mellish, an accomplished optician. He also manufactured many of his own eyepieces, and he did extensive astrophotography, not an easy feat in those pre-digital, pre-autoguiding days. He amassed three huge scrapbooks chronicling his observations from 1924 into the 1990s. In the 1930s, Leight observed regularly with the 18-inch Brashear refractor at the Flower and Cook Observatory in Upper Darby. Gordon remarked that Leight's "lunar and planetary drawings are models of exactness and beauty."

He originated the Society's first newsletter, *The Satellite*, which later evolved into *The Observer*. His skill in mirror making and optics led to his employment in the Naval Arsenal during WWII, where he was engaged in producing precision military optics; at first optical flats, but he eventually became supervisor of the reticle department. While at the arsenal he taught reticle making to Eastman Kodak optical engineers. Following the war, he was in charge of the photo engraving department of the Sandura Tarkette Company, a producer of vinyl floor coverings.



He built Saturn Observatory at his home in Center Valley,

Walter Leight

equipped with an 11-inch f/14.6 folded refractor with optics by Mellish, as well as an 8-inch f/26 Cassegrain, which was featured in the "Gleanings for ATMs" column in the January 1946 issue of *Sky & Telescope* (p. 18). Saturn Observatory was the site of many observing sessions in the early years of LVAAS. Leight was also active during the construction of the South Mountain building by securing materials and outfitting the machine shop.

He also made a 16mm film that documented the construction of the headquarters. This film has since been digitized, and narration provided by George Maurer and Paul Shenkle. Leight always had a close relationship with Ralph Schlegel and Bill McHugh in discussing optical design and it was this team that were the judges at the national Convention of the Astronomical League that the Society sponsored at Kutztown University in 1976.



Walter's Saturn Observatory with 5 scopes out for use. South Mountain is in the background.

A true Renaissance Man, Leight also constructed 116 violins whose instrumental quality were widely recognized and were displayed in many places. He was cited in the book, "*The Violin Makers of the United States*," by Thomas James Wenberg, Mount Hood Publishing Co., 1986, p. 177. He was an amateur film maker, and built his own sets, including miniature ones. According to Rodger Gordon, Leight did cartoon animation "good enough to be offered a job with the Walt Disney studios in California." One of his efforts was a collaboration with George Maurer on the film, "*A Matter of Gravity*." He also invented a disc camera decades before Kodak, but never patented it, and a color processing system as well. He authored a book about a kidnapped Egyptian princess.

Gordon described Leight as a modest man with a wry sense of humor, usually directed at himself, and "a devoted husband and father, a family man in the true sense of the word. … He was a quiet unassuming person who seldom spoke at club meetings, but when he did everyone paid attention. He had the unique ability to look at an optical or mechanical problem and derive a solution to it within minutes, and usually made detailed drawings on the solutions before attempting to put them in to practice." Gordon maintains that Leight hit upon the idea for the Dobsonian mount decades before John Dobson.

As years went by, Leight's presence at LVAAS events waned. His failing health resulted in a stroke around 1996, followed by others. He passed away on January 28, 2000 at the age of 90.

The Telescope

The first reference to Mr. Leight and his 19-inch scope was in the May 4, 1958 LVAAS minutes, where it was recorded that "Mr. Leight spoke about some of his telescopes, particularly his 19-1/2-inch f/3.9."

The largest telescope that Leight made was a 19" short focus Cassegrain. From the July 1971 *Observer*, we learn: "As Walter explained, he obtained a surplus 19" blank of plate glass in July of 1945. This blank, all 31 pounds of it, was only 1-1/4 inches thick, only 1/4 of the thickness required to produce an ordinary astronomical mirror. However, this blank had been especially re-annealed to reduce tendencies of warpage and

tests had proven that it was indeed a stable piece of glass. Despite this, turning an unusually thin blank of glass into an astronomical mirror was an experimental gamble!

"Practicality dictated a modified Cassegrainian design for the sake of portability. The primary was to be f/4 or 76" FL. A secondary was to amplify this five times to an effective focal length of 380" (31'8")". We note that thin mirror making was a radical idea at the time, and conventional wisdom at that time dictated that mirrors have at least a 1:6 thickness to diameter ratio. So, for a 19-inch mirror, the thickness "should" have been 3 to 5 inches.

"Walter began grinding (by hand) in July of 1945 with a 6-inch convex cast iron tool and a ten-inch plate glass tool and continued with varying degrees of enthusiasm and doubt over the next several months. By the end of August 1945, the focal length was 108 inches: the one-inch-thick glass tool was now 5/8 inch thick, and the convex cast iron tool was flat. Leight had used nearly 15 pounds of 46 grit carborundum to get that far. The mirror was finished on December 12, 1945: Leight reported it had a smooth 67% correction. In an unsilvered mode, it was tested on the moon in a crude Herschellian set-up. Regarding this test, Walter's diary notes that, 'Surprisingly, detail was sharp and clear even under extreme high power!'

"Further polishing was continued to a point that brought the mirror's surface to an ellipse suitable for a Cassegrain. In May 1946, Leight built the mirror cell for the mirror. The problem and expense of aluminizing the mirror, together with moving, changing jobs and building a home, caused the mirror to be shelved until June of 1954 when tube and mount designing resumed, and the mirror was sent out to be aluminized.

"For a while, Leight used the instrument without a tube by inserting his head in the center of the light path, observing Palomar-style. A little more than a year later the telescope was complete in Newtonian form. While insufficiently corrected to give coma-free performance as a Newtonian, this fast optical system provided fascinating views of stellar color and nebulous objects. On October 22, 1955 Leight wrote that the optical tube assembly was completed that day. Leight tried it out that night as a f/3.9 Newtonian at 75x to 270x. The images were fairly good at the center of the field. As the temperature dropped, the mirror became nearly 100% corrected for a short time.



LVAAS star party in 1959 at Walter Leight's. The 19-inch scope is on the right. A version of this photo was the cover photo of *Sky & Telescope* in June 1959.

"Mounted on its dolly, the whole assembly weighed about 500 pounds. The final focal length was exactly 75 inches, with a center thickness of .901 inches. Some of our older members will recall using this instrument at observing meets at Walter's Saturn Observatory in Center Valley. On October 19, 1956, Leight projected a 30-inch image of the moon through the scope, and lunar details were faintly visible. In December 1957, Leight observed the Orion Nebula with the scope, using magnifications from 75 to 300 X. He reported that the views were the best he had ever seen, similar to photographs of the object. He also had an excellent view of the double cluster in Perseus. However, he remarked that a field flattener would be necessary for definition at the edge of the field of view."

Interestingly, *The Observer* reported that in October 1964, Leight contributed his scope to the society. However, Leight's notebook states that he donated the scope in August 1972. The October 1964 *Observer* reported that plans called "for the instrument to be converted from its Newtonian form to an f/13 Cassegrainian, with the eyepiece in the declination axis. It has a fork-type equatorial mount. When completed, the instrument will be equipped with wheels so that it can be housed in the ground floor of the new observatory and rolled out onto the observing deck with a minimum of effort. Even with an f/13 ratio, a 19" mirror can provide an interesting view of celestial objects, particularly deep sky objects, and we look forward with enthusiasm to its completion. We extend our heartfelt thanks to Walter for his generosity."

At that time, LVAAS planned to construct a roll-off observatory on the SE corner of the South Mountain site, to house the 10-inch reflector that was then permanently mounted on a pier in that area. The plan was for a two-floor structure of cement block, featuring an observing deck to the south at ground level for use by member-owned telescopes. However, by December 1964, this project was put on hold due to property boundary issues. Later, in August 1965 *The Observer* reported that lights from the A.T.&T. tower adversely affected astrophotography efforts at South Mountain, and the construction of this new facility "would entail the purchase of at least one quarter-acre of land that has recently boomed in value. The expenditure of society funds for this project does not now seem advisable. The time has come for the society to acquire a location suitable for serious observing, possibly to the north or west of the building site, where the skies are not laden with cement dust and there is not skyglow from city lights. A place where we can conduct field meets and craft an observatory to house the proposed 20" telescope as well as the Knecht refractor and the ten-inch reflector. Where members can set up piers for their own telescopes."

In January 1966, plans were announced to build a shed for the 19-inch scope under the steps of the Knecht Observatory. The footings were poured in April 1966, and by August, the shed was nearly completed. Then in September 1966, the strategic focus changed when LVAAS was offered use of Kawecki Observatory and Pulpit Rock, and had already purchased the 20-inch mirror for the Schlegel-McHugh Observatory.

The Leight telescope languished in the shed while work progressed on the 20-inch project. Then, in June 1971, *The Observer* reported that due to increased interest in infrared astronomy, the scope could be ideally used for this application. The next month, *The Observer* reported, "During the past two months (May and June 1971) this instrument has been disassembled and is being reworked to achieve a Dall-Kirkham arrangement for which the primary was designed. Our optical and instrument team of Ralph Schlegel, Bill McHugh and Paul Schenkle have taken charge of this and already many parts have been fabricated and machined."

Paul Schenkle reported that "preliminary testing showed some correction needed and it was felt that this could be best accomplished through a re-polish of the surface which would also remove the old aluminum coating. Accordingly, the back of the mirror was mated to the surface plate of a polishing machine and a 13" polishing tool was prepared and set in motion. After several polishing sessions, a Foucault test in a tunnel showed the curve to be nearing perfection.

"Paul noted that thin mirrors such as this one are experimental and remarked that an amateur reported at Stellafane of his intent to make a 28" mirror from a 2" blank. On-edge testing of a mirror produces the most mechanical strain to the glass and our 19" shows no change of figure in this set up. Adequate support is needed to prevent mechanical flexure in other positions and Paul believes the original cell, as built by Walter Leight, as the most workable arrangement. He indicated that based upon results so far, the 19" should prove to be a fine visual and photographic instrument in addition to its application to infra-red work.

"Ralph (Schlegel) has made two jumbo eyepieces which use lenses three inches in diameter. One of these will give a fairly wide field of view at about 50X which is sure to bore through the atmosphere.

"Testing of the instrument will take place at South Mountain during the next few months. In the meantime, some willing hands are needed to give the tube and mounting a fresh coat of paint. Ralph has made a small-scale model of this scope in a roll-off type observatory which may be considered as a permanent housing. This model will be on display at the general meeting.

"What began twenty-six years ago as an experiment continues with each step building on previous ones to provide improvements and versatility. From this we might conclude that good telescopes used by dedicated observers never die but improve with age!!!"

In January 1972, *The Observer* reported that the scope was being readied for work in the infra-red field in a cooperative program with Dr. Ed Guinan of Villanova University. One difficulty was that the scope was set up for an f/10.6 system while the I.R. detectors were designed for f/15. The decision was then made to regrind the secondary to obtain this ratio. The plan was to silver the mirror to expedite its being put into service.

But it was never put into service. By 1973, the I.R. detector was instead to be used with the soon-to-be-completed 20" Schlegel-McHugh telescope at Pulpit Rock. The 19" Leight scope was again banished to the "dog house" shed... In November 1975, the shed which housed the scope was broken into, the scope wheeled out into the parking lot and abandoned there. Fortunately, there was no damage done to the scope. Hope arose again in February 1976, when plans were underway to move the Leight scope to Pulpit Rock, to be housed in a shed at that location. Donations were sought to cover the cost of this, as well as for the construction of the Spacek Roll-off roof observatory. At that time, the Leight scope was described as an f/10 Cassegrain with slow motion controls and with 3-inch eyepieces yielding magnifications of 75 and 150.

In September 1976 the 19-inch mirror was uncovered and retested. Unfortunately, the Cassegrain secondary and Newtonian flat could not be found. Mike Spacek volunteered to make these items sometime at his Pottstown optical shop.

This is the last we hear of the Leight scope for a decade. In those years, the Schlegel-McHugh Observatory was put into service with an extensive photoelectric photometry program, the 40-inch mirror blank was acquired and ground, and the Schlegel Observatory was built. At South Mountain, the Warden and Brooks Observatories were constructed. All the while, the Leight scope sat neglected. In October 1986, *The Observer* reported that Ralph Schlegel and Pete Brooks were planning to resume the refiguring of the Leight 19-inch mirror.

But again, the Leight scope faded into oblivion, this time for another two decades, when in April 2006, Les Miller and I moved the Leight telescope out of the dog house under the Knecht Observatory stairs, to assess the instrument, and repair the door mechanism. The scope was in pretty rough shape. The scope had an interesting folded light path. Light from the primary mirror traveled up to a secondary mirror at the top of the tube. This mirror sent it back down the tube to a third mirror, at a 45- degree angle, that sent the light out to the eyepiece which is located at the center of the declination axis on the fork mount.



Above, photos of the 10" scope outside of the 'dog house.'

In a moment of extreme weakness, Bob Mohr accepted the project on behalf of the ATM group, to refigure the optics for a fast Newtonian system. Work progressed steadily until 2010, when illness forced Bob to put the project on hiatus. Bob continues the story:

"I had seen the 19" only once before, it was probably in the late 80's, when Pete Brooks pulled it out of the dog house to see what the condition was. That night we observed the moon through it, and even uncoated, it provided reasonable images in the center of the field.

"I believe it was in late 2006 that Sandy requested that we take a look at Walter's 19". When the Telescope Making group first tested the Leight mirror it was still mounted in a welded heavy steel cell. The mirror was epoxied to rigid steel pins attached solidly to the cell. It was not aluminized. We did a simple Ronchi test on the mirror to see how good or bad it was. The image was so distorted that we considered scrapping the whole idea of refinishing the mirror right then and there. It occurred to us that the problem may be the mounting cell, so we carefully removed the mirror from the cell, and sanded the epoxy residue off the back of the mirror. Immediately the figure of the mirror got better, showing that over the years the steel cell had warped. We decided to let it sit for a couple months to remove any stresses that the cell had put into it. A couple months later, we again tested the mirror, and determined that while it wasn't great, it wasn't too bad, and needed to be better parabolized to be used in a Newtonian type design, and the figure needed to be smoothed out. (The curve of the mirror needed to be deepened in the center area.)



Above, mirror as mounted in welded steel cell.

"At the time that Walter built his scope it was considered crazy to make a mirror this large, and this thin. The mirror, while 19" in diameter is only a little over 1" thick, less in the center. Now, however it is not uncommon for large mirrors to be made very thin, they just need a very good mounting cell. These cells are floating designs where the mirror is supported on many points that support the mirror without causing any distorting stress on it. A mirror of this size will likely need an 18-point suspension cell. Note that Walter's original mount was very similar to the modern mount, except that it was not a floating design.

"A few months later, in spring, we started work on the mirror. I machined up a large aluminum backing plate to fit the polishing machine that was donated to the society by Charles Green. The mirror was supported on a rubber pad on top of the aluminum backing plate. We made a 6" diameter pitch on glass polishing tool. We decided to use the undersize tool to deliberately slow the polishing process, as this was to be a learning tool for the entire group.

"At our monthly Telescope Making meetings, we would spend some time polishing the mirror, let it sit for a while to cool, then run a Ronchi test on it. We worked on the mirror each month, except when the shop area was too hot or too cold to use a pitch lap. The machine rotates the mirror, but the pushing of the lap is being done by hand. The various members of the group take turns polishing, which helps to randomize the strokes being used, which makes for a better finished mirror. Over the time we have worked on it, about 20 different members and guests from as far away as India have taken their turns at the machine.



Right, a cell layout for the 19" from the cell design program PLOP.



Above, Bob Hippensteal does a Ronchi test of the mirror.



Above, image from Ronchi for Windows 2.0 program of what the Ronchi test should look like.

"Properly parabolized, the dark bands should curve around the center, and be smoothly curved. We still have a ways to go...

"At the time that I had to step away from the project because of health issues, we had gotten the center of the mirror somewhat deeper, but it still needed more work to deepen the center further and smooth out the rest of the mirror to match. Hopefully later this year we will be able to resume work on the project. Once it is done, a determination will need to be made what type of scope to make with it, a classical Newtonian, or a folded design as it was originally built."

Unfortunately, work has not progressed on the Leight telescope for the last 13 years. The tube assembly presumably still resides in the dog house, and the mirror resides in the back room at South Mountain. We sincerely hope that at some time in the near future, there is a renewed interest in this project, and that the prediction made about the Leight scope many years ago comes true: "...good telescopes used by dedicated observers never die but improve with age!!!"



I owe an apology to Bob Mohr, who has shown a lot of support for this project and this column, and did not deserve to have his name spelled wrong last month. Our editor Frances feels badly about it also, but it is entirely my fault. Frances sent me an email questioning the spelling, but somehow I ignored it until after we published, compounding my original goof. I know better, but somehow in the rush my fingers got too far ahead and my brain never caught up.

Bob also wanted to remind me that Heli Coils are stainless steel, not just steel, and that he has some that we can use on the 40-inch.

Prep Work - I'm still wrapped up in my project of selling the old family homestead in Scranton, though the light at the end of the tunnel is shining very brightly. On the 40-inch project, we are getting ready to take the removable metal parts to a vendor we have chosen for powder coating, so I've been finalizing the specs of some preparation that we want to do. The first part of this is to modify the aluminum panels that form the cover for the primary mirror.

See https://lvaas.org/observer/The_Observer_February_2019.pdf for the original write-up about this idea. The design has evolved a little bit, but the basic plan is still the same. We want to cut back the original aluminum panels and then add a plastic layer with a slightly different shape, that will mesh together better as the cover closes, while eliminating metal-to-metal friction between parts that are just a few inches above our expensive mirror surface. Naturally, we want to do the required trimming and drilling before we do the powder coating.

(I would like to include updated renderings of the current design, but my CAD model is misbehaving and I don't have time to debug it. So, these images are recycled from the issue linked above.)







Shear Good Fortune - Since originally coming up with this plan, we talked about a number of ways of cutting the aluminum, to get a "good clean cut" without distorting the metal. Possibilities included a band saw and a table saw, but then I thought about a certain friend of LVAAS who has a small power shear in his shop, that he normally uses to cut sheet steel. We need to check if these pieces will fit into it and if it will make clean cuts in the aluminum. A few hours after I discussed this with Frank Lyter, LVAAS' Pulpit Rock Observatory Director, I decided to take a look at the listings for tools in the Lehigh Valley on Craigslist, when what to my wondering eyes should appear, but the lovely specimen shown at right! I thought, if our friend's shear won't suit, this one likely will, though we'll have to exercise a little more care to achieve good results.



When I see something on Craigslist that I want, of course I look at the price, but even before that I look for the location. "Lehigh Valley" encompasses a fairly large territory, depending on how you define it; the farthest points are about an hour from my home, which makes me think twice before deciding to travel to check it out. But this was only 15 minutes away, and the price was right, so now it's mine! And I did a bit of testing when I got it home that confirmed my thought that it will be able to do the job.

Drill, baby drill - we also need some new holes drilled into the two bottom plates of what I am now calling the "primary frame," the portion of the "optical tube assembly" that houses the primary mirror. The hole list consists of:

- 1. Mounting holes for the radial mirror support brackets, a pair of holes in each of the eight corners of the octagonal shape. I've written about these brackets in previous chapters of this report. In each pair of holes, one is new and one is an existing hole used to attach the circular plate to the octagonal plate, which will need to be drilled out to a slightly larger diameter. (In the octagonal plate it is currently tapped for 3/8", but it will need to be a clearance hole for a 3/8" bolt to pass through and thread into the bracket.)
- 2. 12 new holes to attach the circular plate to the octagonal plate: 8 in the center of each edge of the octagon to replace the ones we are re-purposing, and 4 more near the center. I noticed a slight gap between the two layers of metal there, before we disassembled it.
- 3. Some holes for counterweights. Before we started disassembling the scope, it had a fairly beefy counterweight hung on one of the collimation adjustment screws. We need to be able to hang some weight on the back of the tube, so it would be nice to have some dedicated threaded holes for that purpose. I designed a layout with room for some Olympic weight plates, 25-pound at the 6- and 12-o'clock positions, and 10-pound at 2, 4, 8, and 10. We would not use all of those, but it is not clear a priori which ones we will need.

4. Accessories. Frank suggested this idea a while ago, that at some point we might want to attach some sort of equipment or instrumentation to the back of the telescope. Chances are, when the need arises we will be required to either drill and tap some new holes, or to make an adapter plate, neither of which is a huge problem. But it seems worthwhile to take a stab at something that might be useful, in advance. The best idea I have come up with is to accommodate some 10" dovetail saddles such as this one or this one, using the holes spaced at 160mm (6.3") that they have in common. I am open to suggestions for other ideas on this.

Here is a rendering of the bottom of telescope, with three dovetail saddles, one 25-pound weight, and one 10-pound weight. You can also see the three clusters of adjustment screws for collimation. (I've left a bunch of stuff out of this model, including the focuser and all of the bolts that hold everything together.)



StarWatch

by Gary A. Becker

beckerg@moravian.edu garyabecker@gmail.com astronomy.org facebook.com/StarWatchAstro/ ©Gary A. Becker for StarWatch



The Sun Can't Hide Forever

I really hate mornings, but when an astronomical event like a solar eclipse is going to take place, I have to let my better angels guide my actions. The devil, however, was right on cue as I lay sleepless in bed at 3:15 a.m. with the alarm set to jangle me awake just 75 minutes later. Whispering in my ear, he cajoled me into thinking that it would be alright to turn off the alarm, to let my internal clock wake me. "You'll be so cranky today, tired, and lifeless, but think about how you will feel if you get an adequate amount of sleep. You'll be rested and so much happier on your birthday."

I renounce the devil each Saturday in church, but the feeling of reluctance has persisted for most of my life when dealing with sunrise events. I'm just not a morning person. So I got up, dressed, and was on the road in about 15 minutes, leaving the devil's enticements behind.

My observing location is about four miles northwest of where I live, a beautiful grassy hilltop with excellent horizons surrounding it. I have been using it for almost 20 years, particularly in the winter for photographing the planets that are near the horizon. I had met the nephew of the field's owner, perhaps as far back as 15 years ago while imaging planets. His girlfriend at that time had been a former Penn State student of mine. We had a little reunion on the field when she joined us and that helped solidify my acceptance to use that location for astrophotography.

Today, however, the grass had not been cut, so it was a little intimidating driving blindly off the road into three-foot swaying stalks. In about 10 minutes my equipment, tripod, camera, intervalometer and filters, were ready to image, but it was evident from the layers of clouds on the horizon that the sun would rise decidedly subdued. That was actually an advantage because I would be able to photograph the sun without filters by watching its image on my digital screen.

The morning air was cool and damp. Cicadas screeched from a distant stand of trees; the moist wind blew in gentle puffs swaying the grass in a rhymical dance amplified by its seed-laden sheaves. A rooster crowed. A stand of dark clouds guarded the west against a darkened landscape as the sun approached the horizon. Rising like a swollen, red orb against the grey, striated clouds, it sparkled through the branches of a distant tree.

This sunrise was much less spectacular than the August 11, 1999 eclipse when the entire sky was awash in reds and lavenders. Watching the first rays of sunlight, I realized that Sol was headed for a larger silhouetted tree and that would delay its emergence by a precious 10 minutes or so. Luckily, the grass had been matted behind

me from a group of departed deer, allowing me a quick escape with my camera to a new location that was well beyond the road. Crescent Sol with its lunar drape emerged minutes after its official rise, cradled in the hollow between two trees. The atmospherics with its linear clouds reduced the brightness of the sun perfectly, allowing me to capture the event without filters while watching my external viewing screen and without imposing any danger to my eyes.

This was my second sunrise solar eclipse. I cannot emphasize how rare and precious these events are and how fortunate I have been to see two of them. It was just the start of a wonderful birthday which continued with an additional five hours of sleep when I returned home, the processing of the photos in the afternoon, ending with a sumptuous dinner and conversation with Bill and Johnny, friends who Sue and I had not seen for almost two years because of the pandemic. It was one of the best birthdays ever. Pictures of the eclipse are here.



The partial solar eclipse of June 10, 2021 was seen against the background of distant clouds making this sunrise event special and able to be photographed without any filters. Because the sun was observed from my digital viewing screen, there was no danger to the eyes. Yes, even when seen through clouds, the sun is very bright. Images by Gary A. Becker...

LVAAS Images the Eclipse! - June 10, 2021



Melissa Wirth



Bill Dahlenburg



Frank Lyter



Frank Lyter



Terry Pundiak



Peter Detterline (with solar filter)

Sky Above 40°33'58"N 75°26'5"W Saturday July 10, 2021 23:00 UTC



Your Sky was implemented by John Walker in January and February of 1998. The calculation and display software was adapted from Home Planet for Windows. The GIF output file generation is based upon the ppmtogif module of Jef Poskanzer's pbmplus toolkit, of which many other components were used in creating the images you see here.

ppmtogif.c - read a portable pixmap and produce a GIF file Based on GIFENCOD by David Rowley Lempel-Zim compression based on "compress" Modified by Marcel Wijkstra Copyright © 1989 by Jef Poskanzer. **Customize Your Sky at** http://www.fourmilab.ch/yoursky/

JULY 2021

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				Last Quarter Moon 01	<u>02</u>	<u>03</u>
Independence Day 04	<u>05</u>	<u>06</u>	<u>07</u>	08	New Moon 09	General Meeting/Picnic - <u>10</u>
						5:00 PM
General Meeting (rain 11	12	13	14	15	16	First Quarter Moon 17
date) - 5:00 PM	_		-			Members Only Star Party
Deadling for submissions					Tull Manua	
to the Observer	<u>19</u>	<u>20</u>	<u>21</u>	22	<u>23</u>	<u>24</u>
LVAAS Board of <u>25</u> Governors Meeting	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>	<u>30</u>	Last Quarter Moon <u>31</u>

AUGUST 2021

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
<u>01</u>	<u>92</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	General Meeting Pulpit 07 Rock - 7:00 PM
New Moon <u>08</u> General Meeting Pulpit Rock (rain date) - 7:00 PM	<u>09</u>	<u>10</u>	11	12	13	Members Only Star Party 14
First Quarter Moon <u>15</u>	16	17	18	<u>19</u>	<u>20</u>	21
Full Moon 22 Deadline for submissions to the Observer	23	24	25	<u>26</u>	27	<u>28</u>
LVAAS Board of 29 Governors Meeting	Last Quarter Moon <u>30</u>	31				

	New Member Application		TEUR AS	
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	ASTRONOMICAL SOCIETY			
	Make checks payable to: LVAAS Mail your completed application(s), with your dues to: LVAAS MEMBERSHIP c/o Gwyn Fowler 97 Yeager Road		FOUNDED 1957	S LIBRO
L Name	2:] Are	you age 18 or older? Ye	es No
Addre	ess:C	ity:	State:	Zip:
Email	Address:]	Phone Number:	
Occup	oation (Optional):			
Wher	e did you first hear about LVAAS?			
Specif	fic Astronomical Interests:			
Are ye	ou a member of other Astronomical Societies?			
Please	e list any astronomical instruments owned:			
Exper	rience in Astronomy (circle one): Novice A	mateur	Advanced Amateur	Professional
Туре	of Membership (circle one):			
Full-t	ime student: \$15 Individual: \$45 Family: \$	65 Junior	: \$15 Sustaining: \$90	Life: \$675
lf you memb they a	are a full time student over the age of 18, you will pership director via email or at a meeting. Student are not a part of a family membership.	need to sho ts under 18,	w proof (class schedule, s should apply for Junior m	cchool ID) to the nembership if
Are yo	ou a part of a Family Membership?: Yes: (Note: Each family member must have a complet	No	o: ion regardless of age)	
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Publishing images is a balancing act!

When preparing your images for publication in The Observer, please consider the following guidelines:

Put the quality in:

- Considering the "print" size of the image, make sure you have at least 150 pixels/inch.
- Use a reasonably good quality for the JPEG compression ratio.

But watch the "waistline"!

- Don't go too much above 200 pixels/inch max.
- Use the lowest JPEG quality that still looks good!
- Shoot for <300KB for a 1/2 page image or <600KB for a full page.

Tip: If you're not Photoshop-savvy, you can re-size and compress undemanding images ("human interest" not astroimages), with an online tool such as:

https://www.ivertech.com/freeOnlineImageResizer/freeOnlineImageResizer.aspx. It will also tell you the pixel size and file size of your original, even if you don't download the processed copy.

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