

Rochester Skies

A publication of the Rochester Astronomy Club

Serving the community since 1996

43.9°N 92.5°W Elev: 1316'



Issue #28

Jan 2019

Rochester, MN

The Rochester Astronomy Club, for the amateur astronomer in all of us, is a non-profit 501(c)(3) organization. ©2019 All rights reserved.

Go to www.RochesterSkies.com for club information and activities.

Highlights

From the President 2

From the Editor 2

ALCON 2018

Scopes of the Past 3

The Evening Telescope Party 9

Astrophotography with Mike Carlin 12

Public Observing with Josef Chlachula 16

2019 Friday Public Observing Dates 17

January's Total Lunar Eclipse 18

Attention Rochester 18

NCRAL 2019 Annual Convention

Presented by the Popular Astronomy Club

**Astronomical Voyages of Discovery:
Past, Present & Future**

May 3 – 4, 2019



Convention Location

Stoney Creek Hotel & Conference Center
101 18th St., Moline, IL 61265

To be the first to know as plans are finalized, please
send your name, club affiliation, and email address to:

2019NCRALInfo@gmail.com

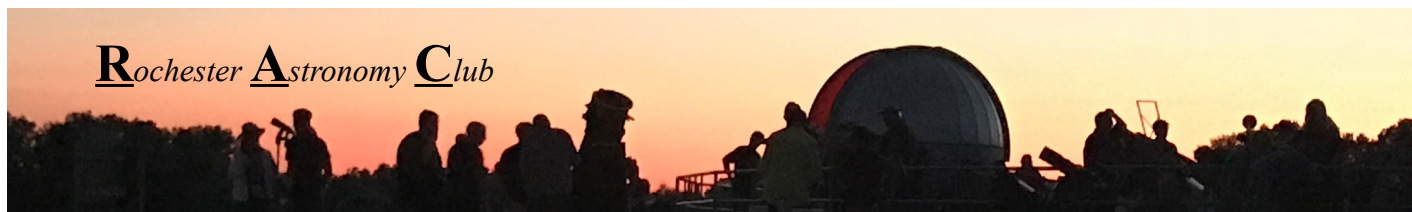


**ALCON
2019**

KENNEDY SPACE CENTER
&
DARK SKY CRUISE
TO THE BAHAMAS

**JULY
25 – 29,
2019**

MORE DETAILS SOON



Year-end Notes from Randy Hemann, President

2018

was another great year for our club. Sometimes it doesn't seem like we get out too much, but if you think about it, we really did remarkable things! So, let's spend a few moments reviewing what we've done. First, I'd like to give a shout out to the subgroup organizing our public outreach events. Josef Chlachula, John Martin and others really did a great job organizing and promoting the soccer field public stargazing events throughout the year showing that you can always see something, even when viewing conditions less than optimal. The other big accomplished this year was the library scope program spearheading by Julie and Chris Gawarecki. The library's biggest problem was that the program couldn't keep up with the demand, right from the start!

While the RAC's mission is to promote amateur astronomy in our communities, a few members need special recognition for their participation in the regional and national societies. John Martin now is editing the Astronomical League's national publication, *The Reflector*. Bill Davidson is the NCRAL's representative to the AL's national council and John Attewell is Vice-Chair of the North Central Region Astronomical League. Thanks to all of you for representing us so well.

What do we have to be thankful for this year? It has been a good planetary viewing year. Although the planets have flown a lower ecliptic path than we prefer, they have had the grace to pace themselves across the sky for us all year. Once the Mars global dust storms abated, it was interesting for folks to look at, despite its notorious reputation of being disappointing to view. We have had a few minor comets to view, and a nice warm moonless summer night to enjoy the Perseids. And to

top it off, the local theater in Lanesboro graced us with the production of Henrietta Leavitt's life story, *Silent Sky*.

The NCRAL meeting in May up in Door County was a success, and a few of us were lucky to also get to the ALCON, held conveniently up in the Twin Cities this July. We have lots of good people surrounding us!

We have had very good participation at our monthly meetings support by mostly local speakers, and our club membership is at an all time high. Let's keep the momentum going into 2019 and have a spectacular year!



Dr. Jay McLaren presenting his talk at ALCON on "The Eye as an Astronomic Instrument" to a large turn-out. (7/13/2018)

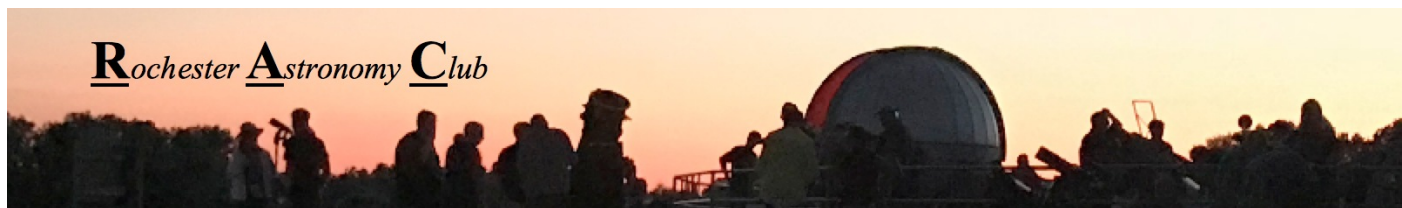
From the Editor . . .

Personal note: cats and telescopes don't mix.

Another year begins before I ever notice one has ended. This issue grew in size from the two conferences that members attended, member accomplishments in the hobby and new ideas furthering the club's outreach program. This brought an abundance of images that many found interesting to view and information to read. While I was piecing this issue together a question came to me: Are digital newsletters becoming obsolete with the growth of the club's webpage? Should we consider a "Newsletter Blog?" This could be constantly updated and provide the many things that a newsletter already performs, except in a more timely matter. What's your take?

-Bill Davidson with a little help from Snow and Rhoads





ALCON 2018: Astronomical Instruments of the Past

The Minneapolis Astronomical Society organized a collection of vintage telescopes and other astronomical instruments along with detail descriptions. Here is a catalog of these telescopes and other instruments presented.



Exhibitor: Steve Emert

A large bronze spectroscope made by C. H. Stoelting Company in Chicago, circa 1930's or 1940's. Dimensions 13" tall and 15" at its widest. →



Exhibitor: Suresh Sreenivasan

Edmund Scientific Astroscan 4 1/8" f/4.2 Newtonian, circa 1992. The Astroscan features a spherical housing around the primary reflector which sits in a case aluminum cradle. In 1976 the innovative design won an Industrial Design Award. Production of the telescoped ceased in 2013 when the only mold for the plastic body broke. ←

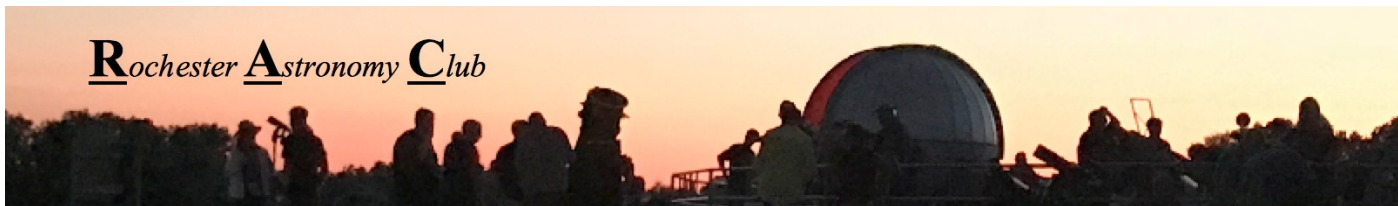


Exhibitor: Suresh Sreenivasan

Quantum 4" f/15 Maksutov-Cassegrain, circa 1978. Optimal Technologies, Inc., was founded by former Questar executive to compete directly with Questar. Quantum optics came from the same source as Questar (Cumberland Optics), and early productions of these single-armed Mak-Casses were well regarded for their optical quality and craftsmanship. Ultimately, poor pricing strategies and chronic supply chain issues brought to its demise after four short years of production. →



continued on next page



Exhibitor: Valts Treibergs

Gebelein Sky Research 8" f/2.9. This telescope was advertised in Sky and Telescope in the early 1980's as a rich-field fast newtonian with a parabolic primary mirror for \$299 (approximately \$750 adjusted for inflation in 2018 dollars). The blue particle board dobsonian mount was an optional \$95 (around \$240 in 2018 dollars). Note the trunion bearings made from standard toilet flanges. As built, the telescope came with a 2" focuser, and the oversized secondary mirror was permanently attached to a non-serviceable optical glass window, thus, not collimatable. A multi-element corrector lens assembly is housed in the focuser tube, reducing significantly coma. This particular telescope was rebuilt and the optical window was replaced by a spider.



Exhibitor: John Hill

Cave Astrola Reflector (6" f/8 Student Model) built by Cave Optical and purchased directly from Thomas Cave's showroom located in Long Beach, CA, in 1960. Cave was a recognized observer and an early builder of quality telescopes for amateurs.



Exhibitor: unknown

In 1970, Celestron introduced the recognizable orange C8, an 8" f/10 Schmidt-Cassegrain. It sold for \$795 (around \$5000 in 2018 dollars). The scope was an immediate success, offering high quality optics in a compact package that was reasonably affordable. This was during a time when almost all telescopes were handmade Newtonian reflectors.



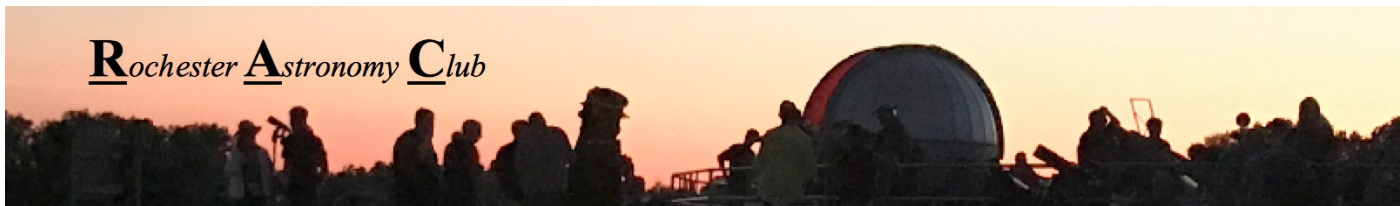
Exhibitor: Suresh Sreenivasan

Orion 3.6" f/13.6 Clear Aperture Reflector (2004) is a mirror-based system with no central obstruction. As a result, this off-axis Newtonian has the benefits of a refractor, such as higher contrast and no diffraction spikes, without any chromatic aberration. The longer 1240 mm focal length mitigates coma and aberrations inherent in reflector telescopes. Sometimes called a Tilted Component Telescope, it is a variant of Scheifspiegler designs dating back to the 1960s.



continued on next page





Exhibitor: Steve Emert

This is a homemade Sun Funnel on a not so vintage Celestron PowerSeeker 60 EQ. Displayed to show a good purpose dedicated to one type of use of a “department store” telescope.



Exhibitor: Suresh Sreenivasan

Unitron 150, built by the Unitron Instrument Company, began selling 3” Zeiss-type air-spaced doublet telescopes in 1951, in partnership with Nihon Seiko of Japan. They continued to sell many models of the highly regarded refractors up until the sale of the company in 1975 to Ehrenreich Photo Optical Industries. Over the years, several manufacturers supplied telescopes to Unitron, up to 150mm aperture, marketed under the names “Unitron” and “Polarex”.

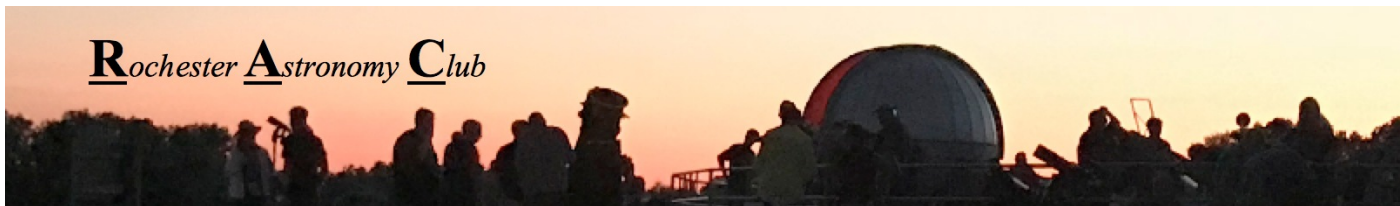


Exhibitor: Suresh Sreenivasan

Criterion RV-6 6” f/8 Reflector, circa 1963. Criterion Manufacturing Company began selling reflector telescopes in 1954. These early versions were priced under \$100 (around \$850 and below in 2018 dollars), and came with parabolic primary mirrors, rack and pinion focusers and achromatic eyepieces. In 1959, Criterion launched the RV-6 Dynascope, which included a German Equatorial Mount, AC motor, rotating tube, setting circles, 6x30 finder and 3 eyepieces for just \$194.95 (about \$1600 in 2018 dollars). This telescope dominated the reflector market in the 1960s. Criterion was sold to Bausch and Lomb in 1982, and they ended operations in 1987.



continued on next page



Exhibitor: John Zimitsch

This is a 6" f/8 Newtonian telescope with an Edmond Scientific Equatorial mount and clock drive, is a quintessential example of amateur astronomy in 1972. John Zimitsch ground the mirror at the age of 15 and built the telescope. The mirror kit and supplies originated from E&W Optical Company in Minneapolis/St. Paul that supported amateur astronomers. The company played a significant role in the birth of the "Twin City Astronomy Club", which grew into the Minnesota Astronomical Society.



Exhibitor: Valts Treibergs

This is the Sky Scope 3.5" f/20 Newtonian reflector made by the Sky Scope Company, Inc., in New York from 1939 to 1955. The telescope was sold direct to individuals from ads placed in popular magazines, such as *Popular Mechanics* and *Sky and Telescope*. Original models (such as this presented) were made from brass tubes. At the start of World War II, the telescope were made in fewer numbers and the tubes were then made from card-board.

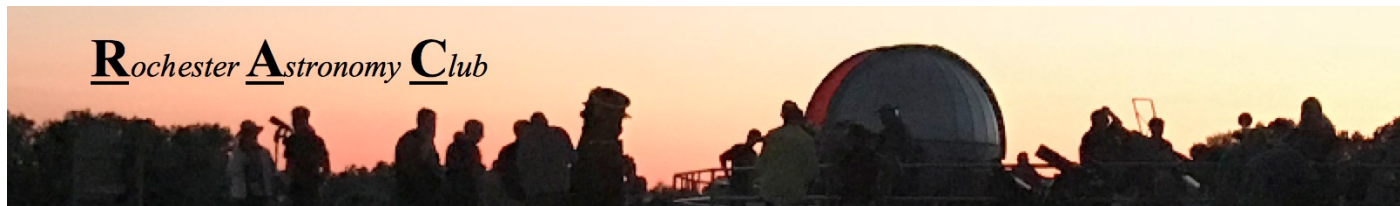
The Sky Scope was used by astronomer David Levy as a boy. The cost of this telescope in 1946 was \$19.75 (about \$250 in 2018 dollars), plus an additional \$8 (approximately \$100 today) for an optional finder. This is the only surviving brass-tube type known, and was purchased by the University of Minnesota.

Exhibitor: Valts Treibergs

GOTO Kogaku Comet - Model 103, F = 750mm D = 40mm (f/18.8) air-spaced Doublet Achromat refractor was manufactured from the mid 1930s and again after World War II until approximately 1955. The Comet was imported by Edmund Scientific in the USA, and sold for \$150 in 1955 (approximately \$1400 in today's dollars). GOTO Kogaku was an early incarnation of Nikon. It came with convertible eyepieces that can be reconfigured to achieve various focal lengths, as well as a unique multi-lensed erect image viewer for terrestrial use, rather than the more common porro-prism.



continued on next page



Exhibitor: Valts Treilbergs

This is an 3" f/15.8 air-spaced doublet achromat refractor, manufactured by Royal Astro Optical Company of Japan, was made in the early 1960s and imported and sold under various brands, including Sears and Scope Optical Company. The optics are highly regarded, and come in a fully collimatable lens cell. The telescope cost \$200 (\$1700 in today's market) in 1960. The equatorial mount has a number of unique features, including a tray light, and can be fitted with an RA clock drive. The finder can be moved for the users comfort as needed and the 0.96" eyepieces are color coded. This particular telescope was originally purchased by Seymour Cray (Cray Computer in Chippewa Falls, WI) and given to the builder of his house.



Exhibitor: Valts Treilbergs

This is the Mirador Super 50mm (2") f/12 air-spaced doublet achromatic compact telescope manufactured in Japan in the early 1960s. The manufacturer is unknown, but could possibly be Royal Astro.



Exhibitor: Valts Treilbergs

The Tasco 7-TE is a 60mm (2.6") f/15 air-spaced doublet achromatic telescope built in 1967 and sold for \$150 (around \$1200 in today's dollars). Tascos of the day were made by several Japanese manufacturers, the best being Royal Astro. The equatorial mount is composed of fine aluminum castings, as most Japanese mounts of the time. The doublet lens cell is collimatable.

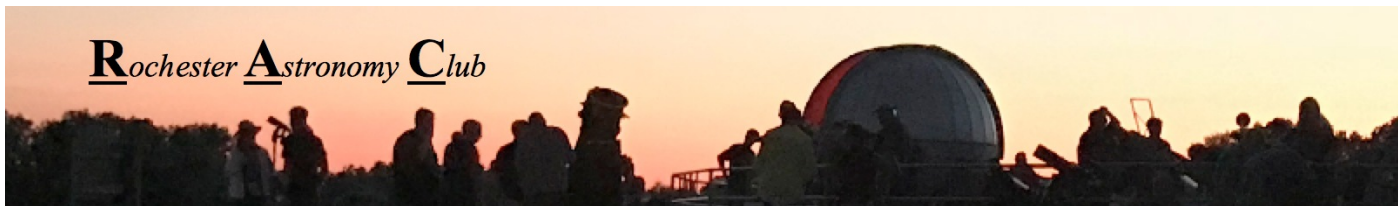


Exhibitor: Valts Treilbergs

Shrine Manon 60mm (2.6") f/11.7 air-spaced doublet achromatic. This was a common telescope in the 1960s. This particular display was made in 1967 and manufactured in Japan by APL. The ALT-AZ mount has precise control in both axes and is a beautiful example of elegant Japanese engineering.



continued on next page



Exhibitor: Ben Huset

The Coulter Optical Company manufactured the Coulter CT-100, a 4.25" f/4 Newtonian (focal length 432mm) which disassembles into two main sections: a mirror unit and a secondary unit. These two main sections have dovetail mounts which slide onto a single bar (with 1/4" threaded tripod mount) which comprises the open tube of the telescope. It also has a 6x30 finder on a dovetail mount. The telescope cost \$99 (\$270 in today's dollars), plus about \$20 (\$55 today) for the optional finder, back around 1980-81 when it was discontinued.



Circa: 1970's

Aperture: 100 mm (3.93")

Focal Length: 377 mm

Mount Type: Tripod (ALT/AZ)

Exhibitor: Ben Huset

Vixen Optics replica of Sir Isaac Newton's reflecting telescope is a sensational instrument for those who appreciate history. This is an operational handmade telescope that duplicates Newton's telescope on the outside, while having superior, modern, optics on the inside. A splendid recreation of the compact 30 cm (11.8") sized telescope brought before the English Royal Conference in 1672. The replica included two eyepieces.

Magnification: 14x (K 20 mm) / 28x (K 10 mm)

Aperture: 70 mm (2.76")

Focal Length: 280 mm (11")

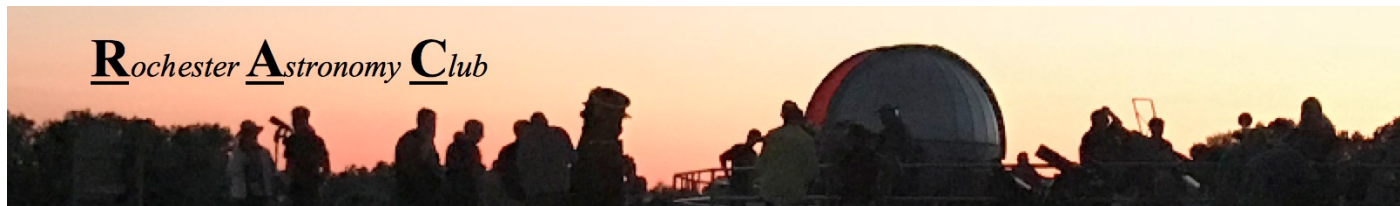
Focal Ratio: f/4

Mount Type: Globe Pedestal



The dollar conversions presented in this article are primarily based on the nation's overall inflation rate over the years and not other parameters that would affect prices: increased inventories of raw material and product, manufacturing costs as automation expanded, supply-and-demand, etc.





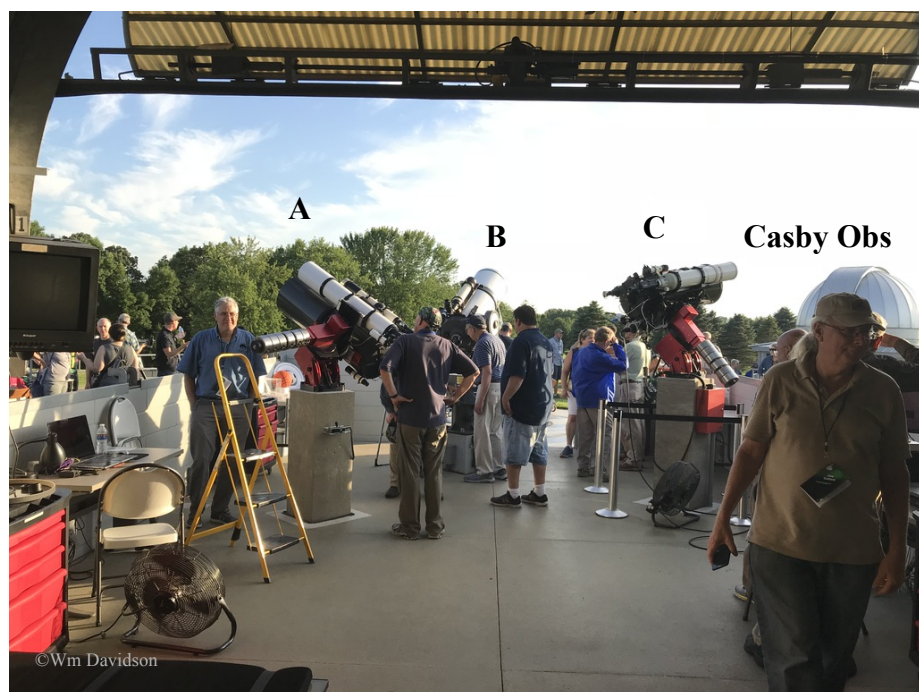
ALCON 2018: The Evening Telescope Party

The Minnesota Astronomical Society opened up their main public outreach facility to the attendees of **ALCON** at the Eagle Lake Observatory (Lat: 44.81, Long: -93.94, Alt: 1000 ft) consisting of the Onan Observatory, the Sylvia A. Casby Observatory and the HotSpot Classroom. The site is located at the Carver County Baylor Park (approximately 51 miles WSW from the Cities).

The Sylvia A. Casby Observatory houses an 8" TMB design refractor, a Takahashi Mewlon 300 Dall-Kirkham and a SV102 refractor. The telescopes are set on an Astro Physics 3600 GTO mount, under a 12.5 foot Ash-Dome. Both scopes have the capability to display live video images that can be transmitted to both the HotSpot classroom and the Onan Observatory.



The HotSpot Classroom provides a safe haven from Minnesota's state bird and a warm interior from the nasty north winds to relax and enjoy presentations with live feeds from both observatories. Approximately 30 individuals can be seated comfortably.



The left image was taken inside the Onan Observatory where more than a dozen telescopes on observing platforms are stored. The "hanger" faces south.

Further detailed information on the labelled telescopes will follow. The larger telescopes on platforms labelled 'A' and 'C' are both Celestron C-14. Platform 'B' sits a Meade 16" LX200GPS f/10 Schmidt-Cassegrain.



continued on next page

The vast majority of the equipment at the observatory was provided by an Anonymous Benefactor. Over the years the donations provided the MAS to build one of the premier public observing facilities anywhere in the United States.

The right image shows a 20" Obsession which would be the largest telescope at the observatory in terms of light gathering capabilities. This was donated by Father Eugene Brown.

Below, labelled 'A', is a telescope platform used primarily for **visual observations**. As mentioned before the largest mounted telescope is a Celestron C-14. Mounted to it is a StellarVue 152, used for exceptional planet viewing, stars and clusters. This telescope can be fitted with a solar filter. The other telescope is a Tele Vue 102 dedicated to solar viewing and fitted with a Coronado H-Alpha solar filter.

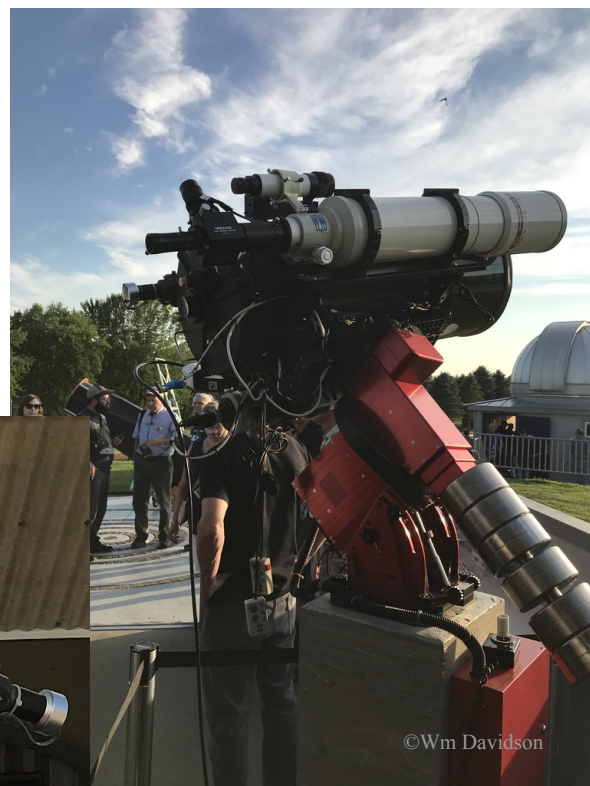
Below, labelled 'B', is the **computer controlled** Meade LX200 Platform used primarily for deep sky and planetary objects. Sitting on top of the Meade is the Tele Vue NP101 telescope which is an exceptional scope at lower power and wide field of view for large clusters of stars. Also, this platform is equipped with a Meade ETX 125 (not shown, it is behind the NP101) whose primary mission is imaging with a Stella-Cam II and PlanetCam. In the image a small monitor is attached to Meade's fork arm allowing guests to see what is being shown through the eyepiece of a given scope at this platform.

continued on next page



With a similar array of telescopes of the first platform, which was dedicated to visual observations, this third platform is dedicated to imaging which is projected onto monitors in the observatory. This Celestron C-14 is equipped with an Astrovid StellaCam 3 and utilizes the Fastar capability of the scope. The Takahashi TOA-130 has an Astrovid StellaCam and a 2.5x or 5x Powermate attached.

This Imaging Platform has other scopes attached to the C-14 that are used for wide field views: a Takahashi FSQ-106N with a StellaCam II and a Tele Vue 76 equipped with a Coronado H-Alpha solar filter.



Dr. Pamela Gay (co-host of the weekly podcast “Astronomy Cast”) and Dr. Phil Plait (author of “Bad Astronomy” blog, webpage and book) pose by the Meade LX200 platform.



Information provided by the Minnesota Astronomical Society’s [website](#).



Mike Carlin's Continued Obsession My Journey into Astrophotography

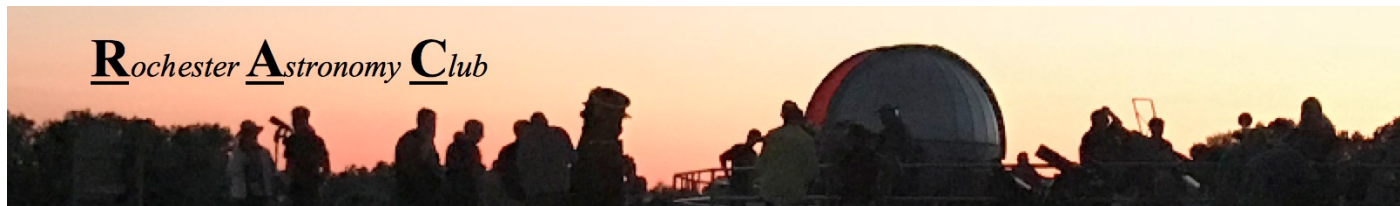
It's been a busy few years, and the clouds have been thick over many of the dark sky weekends. Once in a while, a gem emerges from the haze that brings us the joy and wonders of the night sky... only to be enveloped by clouds yet again. As I continue on my journey into the depths of astrophotography, I have slowly been refining my techniques and polishing my skills.

Since my last article, I've invested in some newer equipment.... a lot of equipment. Let's take a stroll through the astrophotography inventory I use now:

- **8SE OTA:** My orange 8-inch Schmidt-Cassegrain OTA does most of my heavy lifting - Or photon collecting. I would like to upgrade this to a 11" or 14" EdgeHD OTA to image smaller objects.
- **Canon 70D:** This is my primary imaging DSLR camera. I would like to either modify this camera, or pick up a dedicated monochromatic camera.
- **Advanced VX mount:** This is perhaps one of the best investments I've made. The mount is very solid, accurate, and for the price can't be beat.
- **Orion Starshoot AutoGuider with 60mm guide scope:** This handy device sends tracking corrections to the telescope mount by the monitoring the movement of a single star in the night sky. Without it, long exposure photography would be near impossible.
- **Celestron 80mm guide scope:** This was originally going to be used for guiding, but I found the field of view was too narrow, so I keep it on the telescope as a spotting scope. This also helps me center objects for the camera, and it is really handy for public outreach events.
- **Table tent:** One night, Jerome showed up at Eagle Bluff with a table that had a tent on it. I thought I would copy the idea. I made a tent frame with 3/4" PVC pipe, created a tent cover from black vinyl, and placed it on top of a small folding table. This helps keep the dew off the equipment and prevents light from my laptop from interfering with other observers in the evening.
- **UHC/LPR filter:** I have been experimenting using this basic filter. It does help bring out the detail of objects during normal observing, and sometimes with astrophotography, especially in post-processing.
- **6 inch level:** Have you ever worked on something, and fought with it for hours, only to realize you missed the most basic step? Like painting a wall for an hour and realizing you didn't even open the can of paint? After months of fighting with my mount regarding my polar alignment, I finally discovered that I really haven't been leveling my mount correctly. This handy device has since solved most of my alignment issues.



continued on next page



- **Software:** I use several pieces of software to do different tasks on the computer side:

PHD2 (*Push Here Dummy 2*) to help guide the telescope using the guide scope and auto guider camera;

BackyardEOS captures the images of the object;

Neblosity 4 aligns and stacks images;

Photoshop to adjust the color, contrast, and light levels of the final image.



I have some odd and ends that help throughout the night: a car battery with inverter for power, chairs, and a second telescope so I can work on my Messier certificate while the photos are being captured.

So where do I think I stand now?

For the equipment I have, I'm doing pretty good. I've mentioned different types of photos and techniques: dark frames, bias frames and dithering to name a few. When I invest in a monochromatic camera and, perhaps, a new OTA, I should be able to add these additional photos/methods into my workflow. I have experimented with them in testing, but the results were not really noticeable.

The important thing is to keep it fun. This isn't a job, it's a hobby. I'm a patient man, and I enjoy the impact my photos have on my friends and family when I share them.

Where are my downfalls?

I think I need to broaden my horizons. I've spent a lot of time working on galaxies and nebulae, but I've totally ignored star clusters. I'm not sure why this is the case, but there are some wonderful star clusters that I've observed from other observer telescopes.



What do I need to next?

I need to get over my dislike for the cold weather. Probably the best way to help with that is to build an observatory with a space heater. I recently purchased a home that has relatively dark skies. Within a few years, I'll have my own observatory. Maybe after a bathroom remodel, I can work that into a budget somehow.

So what do I have to show for it?

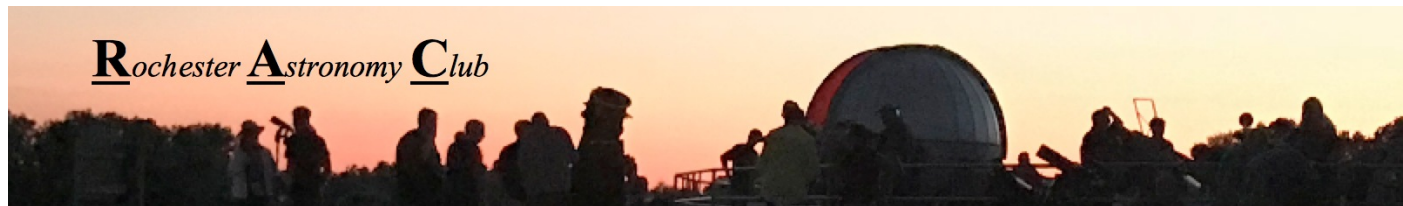
A lot of cold nights have been spent away from my ever-patient wife. She keeps pushing me to pursue my hobbies, as they bring joy to not just myself, but to everyone I share them with.

Solar Eclipse 2017:

The Great American Solar Eclipse of 2017 was an experience that words can only just begin to describe. Photographing the experience was much trickier and more intense than I thought it would be. With my attempt to automate, the photography process was mostly a success.

Now I can say this for sure, as someone once told me: "If you ever go to experience the totality during a solar

continued on next page



eclipse for the first time, DON'T GET YOUR HEART SET ON PHOTOGRAPHING IT! I learned this the hard way but got lucky and managed to get some great photos (Thanks, Dean!). In 2024 our next totality occurs and I plan to be in the path of totality again.

Some of my favorite photos show the flares around the edges. Now, if my rudimentary math is correct, the solar flares were 2-3 times the size of the earth. Just let that sink in for a moment. All of human existence could be represented within the few pixels of this image. You can read more about my experience at my website.

<http://jnmcarlin.com/he-stuff/mike-eclipse2017/>

Comet 21P:

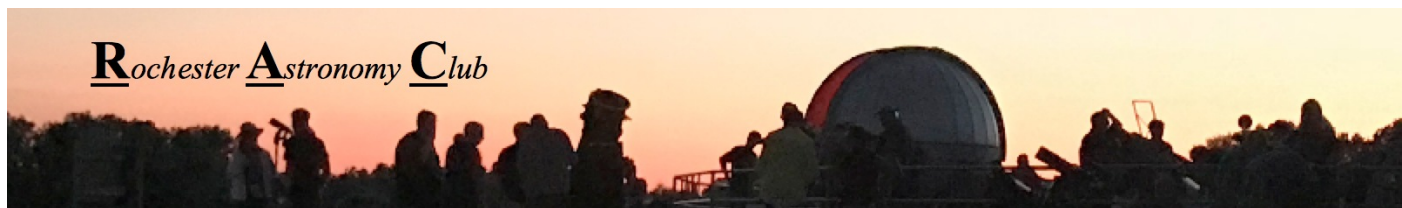
In some of my very early days of observing with my trusty 130mm refractor, I saw my very first comet, C/2011 Lovejoy. I think I was originally looking for Andromeda that evening, but I trailed way off into the constellation Cassiopeia. I then found a faint blob, and I had no idea what it was. Then someone told me it was comet Lovejoy! (Thanks, Dean!) I don't think I even knew how to polar align my telescope when I stumbled on that object. But it goes to show you, sometimes you can find something of interest completely at random. That was probably sometime in 2015.

Fast forward to 2018, I managed to see comet 21P. It was another rare evening at Eagle Bluff, and someone said they were looking for comet 21P. After looking up the info in an app, it looked like the object was about magnitude 10, right about the edge of what my telescope can work with. But after a few test photos, I managed to make a rough 4 frame video. In the following weeks, Randy sent out a challenge to the "club" to see if they can get a photo of 21P in front of M35. Challenge accepted. I managed to create a 3 second video from a few dozen photos one very late night. You can view the video here:

<http://jnmcarlin.com/mike/2018/09/17/>



continued on next page

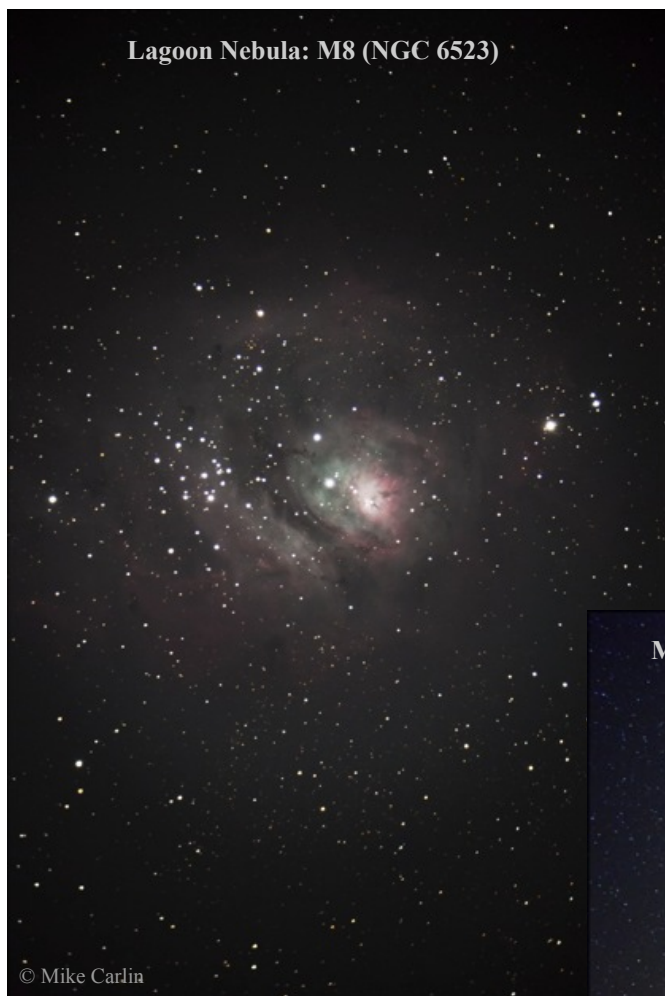


Eagle Nebula: M16 (NGC 6611)

This nebula has been my unicorn for one reason or another. But that changed one evening in July this year.



Lagoon Nebula: M8 (NGC 6523)



Lagoon Nebula: M8 (NGC 6523)

I decided to revisit the Lagoon Nebula one evening, and I was pleased with the results.



Milky Way in Arizona



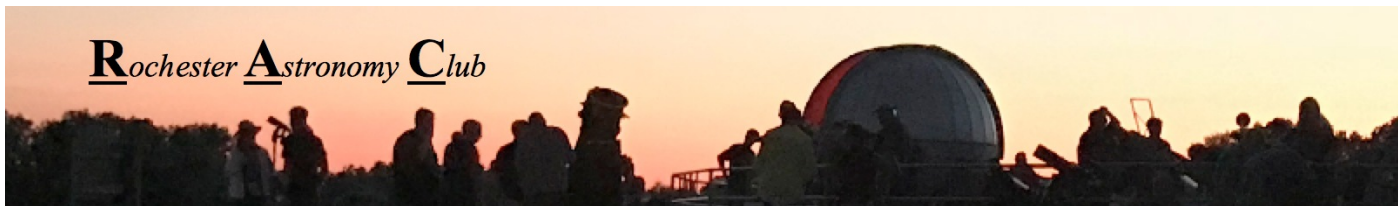
Milky Way in Arizona



As a belated bachelor party, my good friends Nick and Constance decided to treat me to a trip to Kitt Peak observatory in Arizona (Thanks, guys.). With my trusty camera in hand - on tripod - I captured a wonderful photo of the Arizona night sky.

Tip! Don't have a tripod, use some uncooked rice in a ziploc bag on the hood of your car, set the self-timer on your camera and mount it on the rice filled ziploc bag.

If you want sharp, clear stars in your astro-photos, keep your shutter speed to 15 seconds or shorter, low aperture and higher ISO.



Rochester Astronomy Club Public Outreach with Josef Chlachula

In the Summer of 2016 Mike Carlin and Josef Chlachula decided to organize a public outreach for observing on a monthly basis in Rochester. Starting at the Peace Plaza, other members of the club set-up their telescopes and many more by-standers stopped by, curious of the telescope and delighted to look at the moon, many for the first time. There were plenty of questions for the members present, whether they were locals or visiting the Mayo Clinic. All enjoyed the event and the monthly RAC Public Outreach was born.

While the Peace Plaza is a good location for impromptu observation, it was necessary to locate a darker sky within the city limits and the horizon not obscured by tall buildings. One such place found by

Josef Chlachula, was the parking area at the Watson Soccer fields on 41st Street NW. These fields do not have lights to contribute to the existing night pollution of the city and has an excellent view of the horizon. This allows for celestial objects to be observed low in the sky. Observers will benefit from an open western horizon allowing for good evening observations of the Moon and planets.

Twelve RAC members, in October 2017, joined the outreach group with the objective to organize future public sky observing, even through winter. The group meetings were always on Thursday, one week before the scheduled



Observing at Live 125 in Feb 2018



Peace Plaza, 10 Sept 2016

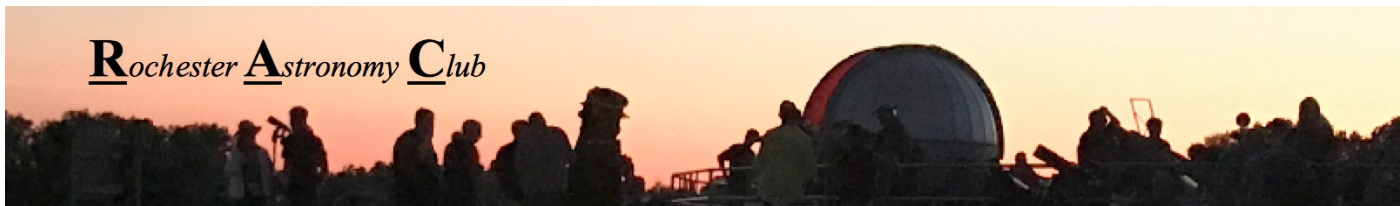
Friday public observing. The attendees provided excellent ideas, including keeping the duty list for these evenings full with fellow members.

From November 2017 to February 2018 the group organized a public viewing at the parking lot of 125 Live, the Center for Active Adults (corner of North Broadway and Elton Hills Dr.). The facility allowed the general public to warm up in the lobby while observing. Unfortunately, the parking lot is lit by very bright LED lights, eliminating all starlight except the moon.

The public observing event occurs each month on a Friday closes to a first quarter Moon. A plethora of interesting objects on the Moon (craters, mares, rifts) in the lights of the city are best visible on the



continued on next page



terminator and in a darker location a few planets and a couple of deep sky objects. Friday provides more free time on evening at beginning of the weekend, and children don't have to go to school next day, so they are more likely to come to the observing events. Observing is two hours long. For upcoming Winter months from January to February we plan just one hour observing.

Please join the public viewing events. Some hardy souls do brave the cold, north wind to get a glance of the dark sky.



2019 Events

Astronomy Days: May 11 and Oct 5

Asteroid Day: June 30

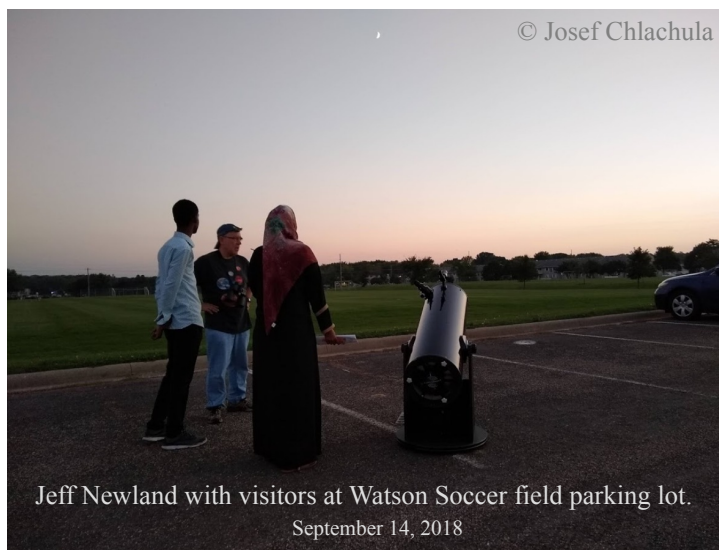
International Observe the Moon Night: Oct 5

World Space Week: October 4 - 10



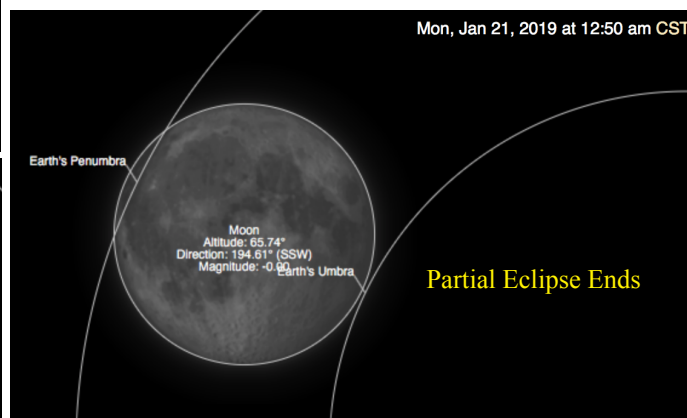
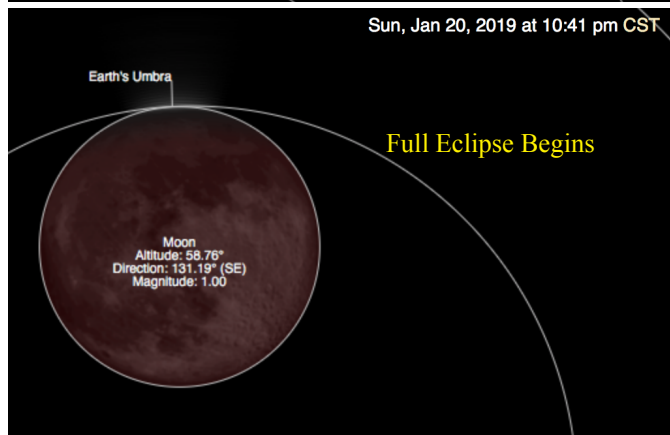
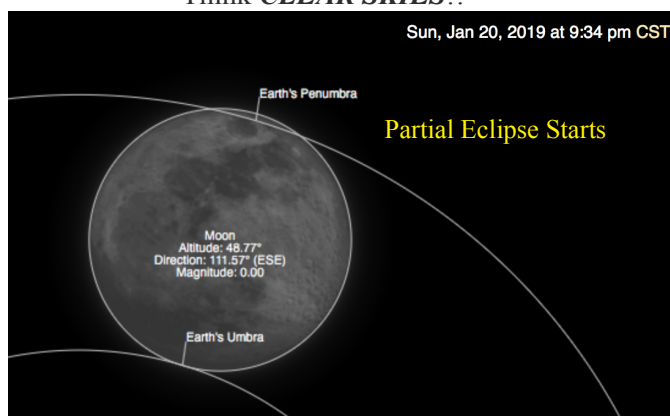
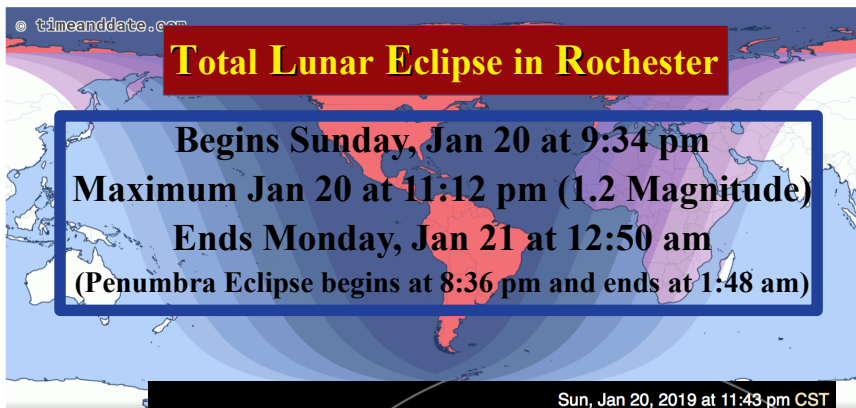
Friday Evening Public Sky Observing in 2019

Month	Jan	Feb	Mar	Apr	May	Jun
Date	11	08	15	12	10	07
Start	6	7	8	8:30	9:30	9:30
End	7	8	10	10:30	11:30	11:30
Moon's Age	4.3	3.7	9.1	7.7	6.3	5.0
Planets to See	Neptune Mars Uranus	Mars Uranus	Uranus Mars	Mars	Mars	Mercury Mars Jupiter Ceres



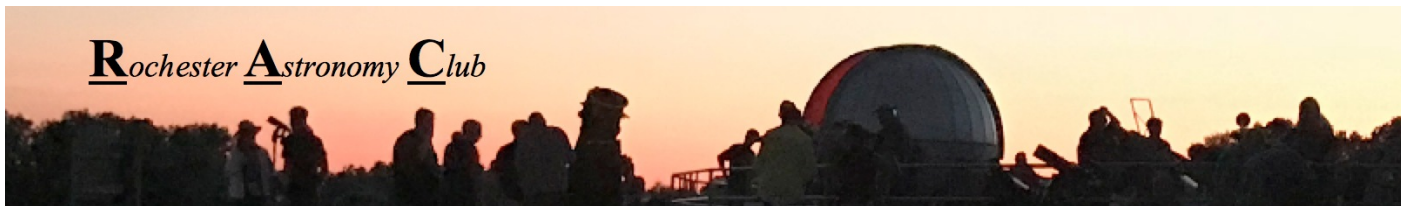
On the night of January 20-21, a total lunar eclipse will pass across both North America and South America, as well as parts of western and northern Europe. This traditional 'blood moon' eclipse will see the moon turn a bright red as the moon passes into the shadow of the earth. The partial lunar eclipse (ignoring the penumbra eclipse) will begin at 9:34pm CST on January 20th and the total lunar eclipse will begin at 10:41pm EST on January 20th. Totality will end at 11:43pm CST on January 20th, and the partial eclipse will end at 12:50 am CST on January 21st.

Think **CLEAR SKIES!!**



!!! Attention Rochester !!!

Coming Fall 2019, *The Mercury Transit*. Monday, November 11, from sunrise to noon.
Make plans now!!



Officers

President: Randy Hemann

Vice President: Kirk Severson
Night Sky Network Rep

Secretary: Brandon Wyman

Treasurer: Julie Gawarecki

Web Master: John Martin

AL Coord:
Star Party Coord-Eagle Bluff Dean Johnson

Rochester's Outreach Coordinator: Josef Chlachula

Star Party Coordinator Rochester: Luka Bazje

Newsletter Editor and Astronomical L Rep: Bill Davidson

Editor's email is rochesterskies@outlook.com

RAC Social Media



[rocheasterastronomy](https://www.facebook.com/rocheasterastronomy)

The **Rochester Astronomy Club** is a non-profit **501(c)(3) organization**. All contents of the newsletter are copyrighted and cannot be reused or redistributed in any form without permission, with the exception to non-profit use providing credit is included.

RAC ©2019



Rochester Astronomy Club
P.O. Box 513
Rochester, MN 55903-0513